English Language Proficiency and Core Content Standards: Linking Documents for the Instruction of English Language Learners

Science

Michigan Science Linking Document to English Language Proficiency Levels

Kindergarten **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Kindergarten Discipline 1: Science Processes					
Standard: Inquiry Process (IP) Natural curiosity about the world around	**-- Collect** realia needed for **scientific experiments** following teacher directions. (Collecting leaves)	**-- Conduct scientific** experiments using realia. Following teacher directions. (**Classify** leaves according to size, shape and color)	**-- Build** hypotheses based descriptions of **scientific observations.** (Why do leaves change color?)	**--Match** explanations with evidence of the findings. (Some leaves fall to the ground in the fall, and others do not.)	**--Conduct scientific** inquiry using many resources. (Looking at informational books, videos, web sites, field trips)
Standard: Inquiry Analysis and Communication (IA)	**--Observe** scientific experiments. (**Discuss** differences in leaves)	**--Chart scientific** experiments. (**Classify** leaves according to size, shape and color)	**--Generate** list of questions (**Why** do leaves change color?)	**--Discuss** an explanation of findings. (Some trees lose leaves and others trees don't. **Why**?)	--**Present** findings to class using a chart or table of leaf differences
Standard: Reflection and Social Implications (RS)	**--Draw** various leaves and circle differences	**--Construct** chart of classified items. (Construct chart of classified leaves.)	**--Partner share** about learning through classification	**--Write** an explanation of findings. (Some trees lose leaves and others trees don't. Why?)	**--Make** a scientific book using many resources. (Use information from books, videos, web sites, field trips)
Kindergarten Discipline 2: Physical Science					
Standard: Force and Motion (FM) Position, Gravity, Force	**-- Place** various objects on a mat**—Repeat** where objects are in relation to other objects—teacher-led sharing (Position) ("The box is <u>in front o</u>f the ball; The house is <u>behind</u> the fire station, etc.) **--Follow** directions for moving objects**.** (e.g"move the	**--Follow** multiple step directions for moving objects. (e.g. "Lift the book and put it on the bottom shelf of the bookcase.") --**Describe** where object is now using place words—"The book is at the <u>bottom</u> of the bookcase."	**--Compare** movement of objects (e.g., "Which goes fastest, skateboard, car, or train?") Use comparison words: Fast, faster, fastest Slow, slower, slowest	**--Predict** movement of objects (e.g., "Tell what happens when you drop a ball.")	--**Demonstrate** that size affects motion of object by using a cone, cylinder and sphere of various sizes and weights. **State** findings. "The red ball moves faster than the red cone because it is round."

Kindergarten **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low** **Intermediate** **ELP Level 2**	**High** **Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
	chair, lift the book")				
Kindergarten Discipline 3: Life Science					
Standard: Organization of Living Things (OL) Living and Non-living Things	**--Explore** animal and plant parts (e.g. skin, feathers, fur, roots leaves stems) **--Observe** plant growth. Draw pictures of observations.	**--Use illustrations** to discuss differences between plants and animals **--Construct a t-chart** use the headings animals/plants; cut and place pictures under proper headings.	**--Read aloud** informational books to gather data for a shared writing on plants and animals **--Label pictures** with names of animal and plant parts (root, stem, flower, tail, paws, fur)	**--Classify/sort** plants using pictures/ drawings under headings: trees, flowers, vegetables	**--Write** a few sentences on characteristics of a familiar plant/animal
Kindergarten Discipline 4: Earth Science					
Standard: Solid Earth (SE) Air, water, soil	**--Construct posters** from magazine pictures of our Earth—including rocks, minerals, water, sky, etc. **Name** objects.	**--Search** for words in big books or trade books associated with Earth—air, water, soil, plants, etc.	**--Distinguish** things that help make plants grow—sun, water, soil from things that are not good—pollution, chemicals, etc. **--Sequence** activities associated with growing a plant	**--Write** a few sentences about our earth	**Construct** a class Earth book, label items, and present to another class **orally**

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1st Grade Science Discipline	**Basic ELP Level 1A**	**Basic ELP Level 1B**	**Low Intermediate ELP Level 2**	**High Intermediate ELP Level 3**	**Proficient ELP Level 4**
Grade 1 Discipline 1: Science Processes					
Standard: Inquiry Process (IP) Natural curiosity about the world around	-- **Collect** realia needed for **scientific experiments** following teacher directions. (simple tools, objects for measuring)	-- **Conduct scientific investigations** using realia. Following teacher directions.	--**Generate** list of questions (**How** can we measure rain?)	--**Construct** a chart of simple tools and their uses	--**Conduct scientific** inquiry using many resources. (Looking at informational books, videos, web sites, field trips)
Standard: Inquiry Analysis and Communication (IA)	--**Observe** scientific experiments. --**Repeat** experiment several times for accuracy --**Discuss** differences among simple tools	--**Chart scientific** experiments (**Classify** simple tools according to size, shape, etc)	-- **Build** hypotheses based descriptions of **scientific observations** (Why does the wheel turn in the opposite direction?)	--**Discuss** an explanation of findings. (Some tools are better at some tasks. **Why**?)	--**Research** various tools used inside and outside the house
Standard: Reflection and Social Implications (RS)	--**Draw** various tools and label	--**Construct** chart of classified items. (Construct chart of simple tools)	--**Partner share** about learning through classification	--**Write** an explanation of findings.	--**Make** a scientific book useful tools (Use information from books, videos, web sites, field trips)
Grade 1 Discipline 2: Physical Science					
Standard: Properties of Matter (PM) Physical Properties	--**Sort** objects according to size shape and color. Discuss rationale for sorting. -- **Make a**	--**Match** pictures of materials or textures with their sources. (tree/paper, cotton/clothes)	--**Describe** objects by their textures (e.g. sandpaper is rough) --**Investigate** simple magnets	--**Match** objects according to texture, size, etc. **Construct** a chart -- **Make a checklist** of things to look for in	--**Evaluate** the usefulness of goods and products. --**Explore and explain** a common household appliance.

1st Grade Science Discipline	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
States of Matter Magnets	**collage** of objects made of different materials and textures (paper, cotton, or wool). **--Observe** forms of matter (e.g. ice melting, steam rising, water). --**Observe and experiment** with the push and pull of magnets	--**Classify** pictures of solid (ice), liquid (water) and gas (steam) according to their forms of matter. --**Match** pictures of appliances and their names. **--Experiment** with the 3 forms of matter using an ice cube, steam and water. --**Describe** observations	**--Read aloud**- simple information books on magnets. **--Draw** a before and after picture of matter. --**Discuss** how jello changes from a liquid to a solid.	matter to be able to say if it is a solid, liquid or gas --**Explore** using magnets and magnetic and non-magnetic materials: **present findings orally**	(toaster, blender) --**Investigate and construct** simple machines such as a lever, inclined plane, balance beam --**Explain orally or in writing** how a specific machine works
Grade 1 Discipline 3: Life Science					
Standard: Organization of Living Things (OL) Life Requirements Life Cycles	**--Explore** various animals and plants in picture books— **--Observe** plant growth. Draw pictures of observations. What do plants need to grow?	**--Use illustrations** to discuss the similarities differences between the needs of plants and animals	**--Read aloud** informational books to gather data for a shared writing on plants and animals	**--Put** in proper sequence pictures of the life cycle of an animal or plant. --Label stages—egg, young, adult or egg, larva, pupa, adult **--Write** a few sentences on the life cycle of a familiar plant/animals	**--Draw and label** life cycle of a plant **--Illustrate** a life cycle of a favorite animal and **present** orally
Standard: Heredity (HE) Observable Characteristics	**--Show** picture of mature and immature plants/animals—learn names and **match** name cards with pictures. (e.g.	**--Play Act** animal actions, such as horse gallop, lumbering of elephant	**--Write or dictate** a sentence about animals and their offspring.	**--Create** a minibook about favorite animal and their babies. **--Classify** pictures of animals under adult/young.	**--Classify** characteristics of an animal that are passed on from parents to young (shape of beak, number of legs, body

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	dogs/puppies, beans/seedlings)				coverings, etc.) --**Construct** a chart and present orally
Grade 1 Discipline 4: Earth Science					
Standard: Earth Systems (ES) Solar Energy Weather Weather Measurement	**--Observe** sunlight coming into the classroom **--Make** a class weather chart to keep track of the weather for 2 weeks. --**Draw** pictures to tell the about the observed weather conditions. **--Make and discuss** weather predictions for the 3rd week based on the data gathered.	**--List** questions about the earth and the sun **--Write** a class big book about how the weather affects us, plants and animals.	**--Write** frame sentences about the weather on sentences strips. If it is (raining), then I can/can't (play outside). Students complete the sentences	**--Write a class "Important Book"** starting with the sun. Model after Margaret Wise Brown's "The Most Important Book" **--List, describe** and **compare** the four seasons—temperature, precipitation, cloud cover, and wind. --**Construct** a 4-door foldable book—one page for each season	**--Construct** a windsock. Explain its function in describing weather conditions. **--List and describe** benefits of "good" weather. **--List and describe** benefits of "foul" weather.
Standard: Solid Earth (SE) Earth Materials	**--Construct posters** from magazine pictures of our Earth—including rocks, minerals, water, sky, etc. **Name** objects.	**--Search** for words in big books or trade books associated with Earth—air, water, soil, plants, etc.	**--Distinguish** things that help make plants grow—sun, water, soil from things that are not good—pollution, chemicals, etc. **--Sequence** activities associated with growing a plant	**--Write** a few sentences about our earth, including natural materials that help plant and animal life (rocks, minerals, soils, water, etc)	**--Construct** a class Earth book, label items, and present to another class **orally**

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2nd Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Grade 2 Discipline 1: Science Processes					
Standard: Inquiry Process (IP) Natural curiosity about the world around	-- **Observe** a plot of land outside classroom—sketch scenery, label objects	-- **Conduct scientific investigations** using realia. Following teacher directions.	--**Generate** list of questions about observations (Where do the birds live? Why are some plants red?)	--**Learn** to read a thermometer --**Construct** a thermometer	--**Conduct scientific** inquiry using many resources. (Looking at informational books, videos, web sites, field trips)
Standard: Inquiry Analysis and Communication (IA)	--**Discuss** differences in various observations of same plot of land over time	--**Chart** observations using an accordion book	-- **Describe** plot of land and what is happening using senses: I see, I hear, I smell, etc.	--**Write** one sentence for 5 observations.	--**Research** answer to a question using books, internet, experts
Standard: Reflection and Social Implications (RS)	-- **Collect** various everyday tools. **Describe** and state purpose	--**Construct** chart of classified items	--**Partner share** about learning through classification	--**Write** an explanation of the technology of tools used every day	--**Make** a scientific book useful tools (Use information from books, videos, web sites, field trips)
Grade 2 Discipline 2: Physical Science					
Standard: Properties of Matter (PM) Physical Properties Material Composition	--**Sort** objects according to color, size, shape, color, texture, hardness. --**Discuss** rationale for sorting	--**Match** pictures of materials or textures with their sources. (tree/paper, cotton/clothes) --**Classify** pictures or objects	--**Describe** objects by their textures (e.g. sandpaper is rough) --**Compare and discuss** the various weights of objects. Ex: "This ball is	--**Match** objects according to texture, size, etc. **Construct** a chart	**Evaluate** the usefulness of various measuring tools. --**Write/illustrate** about single substances and mixtures in science

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	-- Make a collage of objects made of different materials and textures (paper, cotton, or wool) **--Experiment** with various objects that sink or float -- **Discuss/ Illustrate** observation.	as single substances (ice, copper, sugar, salt) or mixtures (salt and pepper, mixed fruit). **--Measure** various objects using rulers meter sticks, measuring cups, spoons. State: "This book is ___ centimeters long." "This is a cup of milk."	heavier than this book because it weighs 20 more ounces."		journals using a T-Chart.
Grade 2 Discipline 3: Life Science					
Standard: Organization of Living Things (OL) Life Requirements Life Cycles	**--Explore** various plants in picture books**—** **--Observe** plant growth. Chart observations. What do plants need to grow?	**--Use illustrations and sequence** life cycle of a plant—seed, plant, flower, and fruit **--Draw and label** life cycle of a plant	**--Read aloud** informational books to gather data for a shared writing on particular plants.	**--Write** a few sentences on the life cycle of a familiar plant—buddy write	**--Illustrate** a life cycle of a favorite plant or flower and **present** orally
Standard: Heredity (HE) Observable Characteristics	**--Show** picture of mature and immature plants—learn names and **match** name cards with pictures. (beans/seedlings)	**--Classify** characteristics of plants according to leaf shape, flower type, color, size, where found	**--Write or dictate** a sentence about plants as they grow	**--Create** a minibook about favorite plant or flower	--**Construct** a class book of leaves or flowers. Label and write one or two sentences on each page
Grade 2 Discipline 4: Earth Science					

2nd Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low** **Intermediate** **ELP Level 2**	**High** **Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Standard: **Solid Earth** **(SE)** Surface Changes	**--Construct a relief map—** include the major land forms of mountains, plains, plateaus, valleys, hills --**Label** each land form	**--Search** for examples of land forms in big books, trade books, or magazines	**--Distinguish** characteristics of each landform in comparison to the rest. What makes a hill a hill instead of a mountain? Use comparison words: bigger, flatter, etc.	**--Write** a few sentences about each land form. Make a flip book	**--Construct** a class landform book, including descriptions and examples of each landform and present to another class **orally**
Standard: **Fluid Earth** **(FE)** Water Water Movement	**--Find pictures** of various water sources (wells, springs, lakes, rivers, oceans). Sort according to size **--Construct posters** from magazine pictures showing water or water being used to help people. (e.g. water used for baths, drinking water)	**--Search** for words in big books, trade books, or magazines associated with water (such as rain, ice, hot, river) iceberg)	**--Distinguish** activities that use water from those that don't, based on written phrases and pictures (such as "brush hair" or "take a bath") **--Classify** activities that you do ***with*** water from those you do ***in*** water (such as brush teeth or go swimming)	**--Sequence** sentences to show how to do activities that involve water (such as cooking rice, cleaning floors) --**Draw or find pictures** showing various states of water: solid, liquid, or gas --**Describe pictures** using describing words like freezing, cold, hard, melting)	**Read** various non-fiction books on the water cycle. --**Compare versions**—report out

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3rd Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Grade 3 Discipline 1: Science Processes					
Standard: Inquiry Process (IP) Natural curiosity about the world around	**-- Draw scientific pictures** and label them (such as life cycles)	**-- Conduct scientific investigations** using realia. Following teacher directions.	**--Generate** list of questions about observations --Use question words such as who, what, when, where, why, what if…	**--Maintain** a science journal	**--Maintain** a science journal with explanations, and label illustrations
Standard: Inquiry Analysis and Communication (IA)	**--**With a partner, **investigate** an interesting science question (gravity, speed, etc.) and discuss possibilities --**Use question starters** (what, where, why, who, when, what if)	**--Chart** observations using a T list	**-- Explain T-list** to another team investigating the same question -- Discuss findings and combine into one team chart	**--Write** one paragraph about investigation findings	--**Research** answers to question using books, internet, experts and add to writing
Standard: Reflection and Social Implications (RS)	**--Listen attentively** to a text read aloud about a multicultural scientist that has made our lives better (Arab, Hispanic, African-American…)	**--Read and discuss** about other inventors and scientists—**take notes**	**--Collect** information about one scientist of interest—work with a partner	**--Write** and illustrate one page about the inventor	**--Make** a class book about various multicultural scientists and their contributions --**Present orally** to another class
Grade 3 Discipline 2: Physical Science					

3rd Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low** **Intermediate** **ELP Level 2**	**High** **Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Standard: Force and Motion (FM) Gravity Force Speed	**--Play** tug of war—use push and pull to explain force **--Experiment** with gravity (ball dropping, twirling a ball around in an orbit…)—use words like gravity, heavy, light, orbit, Earth, push, pull, law	**--Read** about Galileo or Newton—discuss experiments they did and duplicate one in class	**--Demonstrate** the force of air leaving a balloon or a toy car on a ramp---use these words—push, pull, strength, mass, move, speed, distance --**Sequence** experiment in writing	--**Make** an alphabet book of force words. Illustrate and write one sentence for each force word.	--**Share** book with 1st or 2nd graders. **Explain** force --Create a double-bubble thinking map to compare and contrast the forces of push and pull
Standard: Energy (EN) Forms Light Sound	**--Experience** different kinds of light and light sources—flashlight, candle, blacklight, shadow, sun --**Experience** different sounds—identify source --**Follow teacher's directions** on various experiments with light and sound	**--Sort** pictures into light or sound and **List-Group-Label** --**Experiment** with light making shadows and "bending" light in water—use words like straight, bend, shadow, travel, pass through --**Experiment** with different vibrations and chart—use words like fast, faster, slow, slower, vibration, pitch	**--Write** experiment with light or sound in scientific method form --**Summarize** information from informational book on light or sound using post-it summary technique	--**Practice** a musical instrument—explain different pitches to another student --**Make a thesaurus class book** of different words to describe sound (loud—earsplitting, harsh; soft-quiet, peaceful)	--**Create** a musical play about pitch and vibration using student- created instruments
Standard: Properties of Matter (PM)	**--Match** statements of science facts with illustrations (ex: Metal gets hotter	**--Discuss** fact or opinion on light energy statements (ex: Light from the sun is reflects	**--Experiment** with heating various materials with various light sources—discover	-- **Organize** experiment information in chart form and **summarize** findings	**Make** a Conducts Heat and Reflects Heat quiz for classmates using realia

3rd Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Conducive and Reflective Properties	than wood when the sun heats it)	off objects and enters our eyes—fact or opinion? Blue light is shiner than white light—fact or opinion?	which materials get hotter --**Retell experiment**		
Grade 3 Discipline 3: Life Science					
Standard: Organization of Living Things (OL) Structures and Functions Classification	**--List-Group-Label** **Sort** pictures of plant parts and animal parts into two categories and label parts. Use words like roots, leaves, stems, backbone, skin, shell, etc. --**Label** parts.	--**Discuss why** pictures are classified in each category—use observable physical characteristics --**Retell** function of each item using full sentences: "The plant uses the roots to get water from the ground."	--**Display** pictures of various plants and animals and have students pick one to research more information --Provide leveled informational books on each plant and animal	--Students **orally report** to the class information on their plant or animal, including information about functions of plant and animal parts: ex: "This is a paw. The honey bear uses it to scratch the tree to get bugs to eat."	--**Compose** a poem or song about chosen plant or animal using function words and parts—ex: "A horse is an animal …a horse, of course."
Standard: Evolution (EV) Environmental Adaptation	**--List** 10 living things—5animals, 5 plants --**Sort pictures** by characteristics and record on chart paper—note shape, size, color, body covers, etc. --Say word in a sentence e.g. "This bear is large." --**Connect visuals** with words (red bird)	--**Choose** one animal or plant and **write** one or two sentences on how that animal or plant is able to live in their natural environment: ex: "The ant eater has a long nose to help scoop up ants to eat."	**--Use THIEVES technique** to skim informational books about Environmental Adaptations of certain plants and animals in Michigan	**--Use 3-1-2 Strategy form to summarize** information on a Michigan plant or animal that has adapted to their environment	--**Create** a class Environmental Adaptation book on Michigan plants and animals --**Share** with grade 2 students

3rd Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Grade 3 Discipline 4: Earth Science					
Standard: Earth Systems (ES) Natural Resources Human Impact	**--Watch and listen attentively to a video clip about pollution and make a poster** to illustrate the harm that polluting water can cause --**Find** and cut out articles and pictures depicting recycling --**Sequence** descriptive sentences and pictures to illustrate the recycling process	--**List natural resources** that the class uses in one day (water, vegetables, sunlight, paper from tree, etc) --**Recycle paper** in school for one week and calculate how much is saved --**Report** findings	--In teams, **Classify** natural resources into renewable or non-renewable resources --**Compare** choices with another team. --**Defend** why item is placed in each category	**--Research** the 1989 Exxon Valdez oil spill in Price William Sound off the coast of Alaska **--Report out** findings	**--Research** things that people can do to help the environment—recycling, reusing, restoring resources --**Create a mock newscast** to influence others to recycle, reuse, renew
Standard: Solid Earth (SE) Earth Materials Surface Changes Using Earth Materials	--**Sort** different types of earth materials: place in 4 categories, then 3, then 2 --**Say:** "This belongs here because…" and reasons for placing items in various categories (such as "…because it is hard/wet/soft."	--**Sort** various rocks into categories; make a t-chart --**Generate** questions about rocks	--**Discuss and illustrate** –Rock Sayings: *Your head is as hard as a rock.* *I am between a rock and a hard place.* *She has a heart of stone.* *Build your house upon a rock, and not shifting sand.*	--**Discuss and investigate** various changes in the Earth's surface—erosion, volcanoes, glaciers, landslides, earthquakes	--**Construct** a "Using Earth's Materials" **display** and orally report about each item and its man-made use: ex—clay is useful to make bricks; trees can be made into lumber to build houses --**Write a 3 paragraph** essay about the usefulness of one earth material

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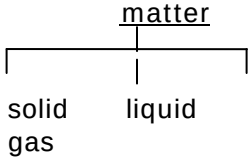
4th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Grade 4 Discipline 1: Science Processes					
Standard: Inquiry Process (IP) Natural curiosity about the world around	**-- Draw scientific pictures** and label them (such as solids, liquids, gasses)	**-- Conduct scientific investigations** using realia. Following teacher directions.	**--Generate** list of questions about observations --Use question words such as who, what, when, where, why, what if…	**--Maintain** a science journal	**--Maintain** a science journal with explanations, and label illustrations
Standard: Inquiry Analysis and Communication (IA)	**--**With a partner, **investigate** an interesting science topic (electrical circuits, fossils, survival, etc.) and discuss	**--Chart** observations using a T list	**-- Explain T-list** to another team investigating the same question -- Discuss findings and combine into one team chart	**--Write** one paragraph about investigation findings	--**Research** answers to question using books, internet, experts and add to writing
Standard: Reflection and Social Implications (RS)	**--**Build a model (electrical circuit, magnet, food web, etc.) --**Sequence** directions	--**Follow 3-4 step directions** and then restate directions for another student to follow	--**Develop questions** about model	**--Read about** electricity and inventors	**--Create** a book of inventions, listing inventor, inventions and how each invention contributes to society
Grade 4 Discipline 2: Physical Science					
Standard: Energy (EN) Forms Energy and Temperature Electrical Circuits	--**Experiment** with heat, electricity, magnets --**Make a collage** depicting examples of heat and using	--**Experiment** with and learn to read different types of thermometers—use hot, hotter, hottest; cool, cooler, coolest	--**Build** a circuit with a single battery, wire, and bulb. Light a lamp. Use 2 batteries with both + signs in the same direction. Now reverse one of	--**Experiment and discover** how electricity and magnetism are related; **use a double-bubble thinking** map to explain relationship	--**Research** electricity, narrow topic, and write a 3 paragraph summary on electricity

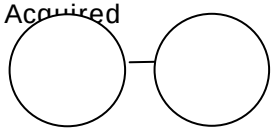
4th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
	electricity --**Label** heat and their sources		the batteries. --**Discuss** what happens	--**Make** an electrode magnetic. Try again to pick up paper clips. --**Explain** what happens	
Standard: Properties of Matter (PM) Physical Properties States of Matter Magnets Conducive and Reflective Properties	**--Experiment** with different types of magnets --Make a t-chart: magnetic materials/non-magnetic materials	**--Group and classify** various materials (matter)—use 3-4 categories. Label each item and the categories	--**Look through** magazines, and web sites for pictures of solids, liquids, gasses --**Classify pictures** under correct heading --**Describe** objects using size, shape, feel words	--**Measure** various objects by weight, volume **--Chart and label** results	--**Experiment** with dry ice to explore the properties of matter --**Write observations** in a science journal and share with another team --**Write an essay** about global warming, its causes and effects
Standard: Changes in Matter (CM) Changes in state	**--Observe, discuss, and identify** properties of water: freezing, boiling, and evaporating --**Find** and cut out examples in magazines --**Illustrate and distinguish** between a solid, liquid, and gas; **Say** "This is a (solid,liquid,gas)." or "This rock is a solid."	**--Make a concept map** of forms of water. --**Discuss** each vocabulary word and find examples of each --**Make a tree map**:  	**--Observe** the effects of energy in the water cycle --**Experiment** with water evaporation, condensation, and freezing --**Write sentences** using stem to show physical changes in matter: "If you…then you will …., but you…" Ex: "If you melt ice cubes, then you will have a puddle, but you will still have water."	--**Discuss, write, illustrate** observations in science journals	**Create** a song about changes in matter—use the terms *solid, liquid, gas, heating, cooling, change, state*

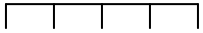
4th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Grade 4 Discipline 3: Life Science					
Standard: Organization of Living Things (OL) Life Requirements	--**Differentiate** between healthy and unhealthy foods after watching and listening to a demonstration. --**Make posters** using magazine pictures. **Label** pictures and **say** "This is a healthy food." Or "This is unhealthy."	--Read "Gregory the Terrible Eater" by --Make a menu for a healthy breakfast, lunch, or dinner --**Compose a list** of "healthy" requirements for plants and other animals to grow	--**Experiment** with various plant settings—one without light, one without water, etc. --**Record observations** in science journal	--**Retell** experiment in proper sequence to class	--**Construct a large class collage** of living things and their requirements for life --**Write a short essay** on personal environmental responsibility
Standard: Evolution (EV) Survival	--**Explore** various animals, insects, etc.—**identify and chart** differences in color, leg length, size, wing size --**Copy or construct sentences** comparing differences by using words like stronger, longer, brighter, etc. "This tree is tall. The oak tree is taller."	**--Predict** which animal will survive given a list of characteristics compared to other animals and state why	**--Make a multi-flow thinking map with the class** **--Chart causes** for the extinction of endangered species, such as the dodo bird or duckbill platypus --**Use** the following terms in the thinking map: extinction, animals, survival, advantage, size, strength, reproduction…	**--Read informational books** about various environments and the animals that thrive there --Summarize information on a poster	--Who am I? **Make** a guessing game from posters
Standard: Ecosystems (EC)	**--Sequence** a food chain using picture cards --**Say one**	--**Match pictures** of animals to their habitats	**--Discuss** various food chains and food webs and choose one to	**--Evaluate** which animal you would like to be, if you were an animal, and tell why	--**Research** about one natural disaster (Katrina, volcano eruption, etc.) and

4th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Interactions Changed Environment Effects	**sentence** about each card using sequence words such as first, next, then.	--**Choose one habitat** and **research** animals, plants, insects that live there and how they help each other use these words in sentences: interact, food, shelter, helpful, harmful	present to classmates --**Write 3 sentences** for each food chain, using key words	you would survive	its effect on one food chain—which animals died, which animals moved to a new location --**Report out** to class
Grade 4 Discipline 4: Earth Science					
Standard: Earth in Space and Time (ST) Characteristics of Objects in the Sky Patterns of Objects in the Sky Fossils	--**Look at pictures** of the constellations --**Watch and listen to media about** how they got their names --**Draw, color, and label pictures** of constellations --**Say** "This is the Big Dipper. It looks like…."	**--Create** scientific models based on illustrations and teacher directions: "Show how the moon goes around (rotates) the earth." "Show how the earth moves around the sun." --Read the Informizing book "Millions of Years Ago" by Steve Moline --**Discuss differences** between the land a million years ago and now	**--Use** a double-bubble thinking map to **compare and contrast** the sizes of objects in the sky—"The sun is bigger than the biggest planet." --**Create a double-bubble thinking map** comparing life forms today and those found in fossils from years ago	**--Make** a Space book of terms with illustrations and one sentence with each—orbit, spin, year, cycle, moon, movement, sun, sky, day/night, etc. --**Locate places** on a world map where recent fossils have been found --**Write a mini-report** about one fossil	**--Create a non-fiction book** about object in the sky or creature that lived long ago. Include content page, index, headings, diagrams, maps, pictures, labels, etc. --**Share** with kindergarten class

Michigan Science Linking Document to English Language Proficiency Levels

5th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Grade 5 Discipline 1: Science Processes					
Standard: Inquiry Process (IP) Natural curiosity about the world around	**-- Draw scientific pictures** and label them (such as gravity, animal systems, seasons, the solar system	**-- Conduct scientific investigations** using realia. Following teacher directions.	**--Generate** list of questions about observations --Use question words such as who, what, when, where, why, what if…	**--Maintain** a science journal	**--Maintain** a science journal with explanations, and label illustrations
Standard: Inquiry Analysis and Communication (IA)	**--**With a partner, **investigate** an interesting science topic (solar system, gravity, speed, genetics, etc.) using pictures. **Choose one picture** and make one sentence to **describe** it**.**	**--Chart** observations using a T list	**-- Explain T-list** to another team investigating the same question -- Discuss findings and combine into one team chart	**--Write** one paragraph about investigation findings	--**Research** answers to question using books, internet, experts and add to writing
Standard: Reflection and Social Implications (RS)	**--Build** a model (solar system, animal systems, race track, etc.) --**Sequence** directions	--**Follow 3-4 step directions** and then restate directions for another student to follow	--**Develop questions** about model	**--Read about** electricity and inventors	**--Create** a book of inventions, listing inventor, inventions and how each invention contributes to society
Grade 5 Discipline 2: Physical Science					
Standard: Force and Motion	--**Experiment** with friction, gravity, air	--**Experiment** with and learn to read different	--**Build** a circuit with a single battery, wire, and	--**Experiment and discover** how electricity and	--**Research** electricity, narrow topic, and write a 3

5th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
(FM) Force Interactions Force Speed	resistance, magnets --**Make** a race track for model cars-- --**Say** and **label** actions: motion, same direction, opposite direction,	types of thermometers—use hot, hotter, hottest; cool, cooler, coolest	bulb. Light a lamp. Use 2 batteries with both + signs in the same direction. Now reverse one of the batteries. --**Discuss** what happens	magnetism are related; **use a double-bubble thinking** map to explain relationship --**Make** an electrode magnetic. Try again to pick up paper clips. --**Explain** what happens	paragraph summary on electricity
Grade 5 Discipline 3: Life Science					
Standard: Organization of Living Things (OL) Animal Systems	--**Differentiate** between different animal systems—digestive, circulatory, respiratory, skeletal—using pictures --**Sort into categories.** **--Label** each system		--**Experiment** with various plant settings—one without light, one without water, etc. --**Record observations** in science journal	--**Retell** experiment in proper sequence to class	--**Construct a large class collage—** orally demonstrate each animal system in action --**Write a short essay** on animal systems and how they work together to do specific things—
Standard: Heredity (HE) Inherited and Acquired Traits	--**Explore** various animals, insects, etc.—**identify and chart** differences in color, leg length, size, wing size --**Name** each animal and compare certain traits using words like stronger, longer, brighter, etc. "The tiger's	**--Match** which animal would live in a given environment using a list of characteristics and state why—Ex: "The camel would live in the desert because of the shape of his feet and capacity to store water."	**--Make a double-bubble thinking map,** charting the differences between inherited and acquired traits Inherited Acquired 	**--Read informational books** about various environments and the animals that live there—focus on inherited and acquired traits --**Summarize** information on a poster	--**Debate** which is more important for humans and why—inherited traits or acquired traits from the environment

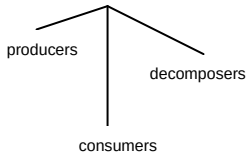
5th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
	claws are sharper than the rabbit's claws."				
Standard: Evolution (EV) Species Adaptation and Survival Relationships Among Organisms	--**Match pictures** of animals to their habitats --**Sort pictures** of organisms that are anatomically similar to recreate the classification of organisms --Make a tree map of findings 	--**Choose one habitat** and **research** animals, plants, insects that live there and how they thrive. Use these words in sentences: adapt, instinct, learn, habit, traits	--**Create a double-bubble thinking map** comparing life forms today and those found in fossils from years ago—include environmental changes, food, size, learned habits	**-- Read informational books** about how man has adapted to his environment through time and predict how he will have to adapt 50 years from now given elevated levels of pollution, overcrowding, shortage of land and water…. **Report out orally**	--**Research** about one natural disaster (volcano eruption, asteroid impact, tsunami, etc.) that has led to a species extinction --**Report out** to class
Grade 5 Discipline 4: Earth Science					
Standard: Earth Systems (ES) Seasons	**--View and listen attentively** to presentation or read-aloud about seasons**. Demonstrate understanding** of why there are different seasons, using pictures and models of the earth and sun --**Listen to and**	**--Create** scientific models based on illustrations and teacher directions: "Show how the earth tilts on its axis as it goes around (revolves) the sun."	**--Make a Time book—**include illustrations, sentences, and brief explanations of 1 year—one revolution of the Earth around the sun 1 month-- 1 week-- 1 day-- 1 hour--	--**Write a mini-report** about your favorite season and why it is your favorite. Include the sun's warming (or not), climate, environmental changes, activities done, length…	**Write a song or poem** about seasons (use Jim Walters song as a model)

5th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
	sing "Seeds and Seasons" from Science Through Song by Jim Walters		1 minute-- 1 second--		
Standard: Earth in Space and Time (E. ST) Solar System Solar System Motion	**--Create a model** of the solar system using clay to represent different planets and other objects in the solar system (asteroids, moons, etc. --**Discuss** how this model is different/similar to the real solar system	**--Experiment** with different phases of the moon using a light bulb and Styrofoam balls. Go through the 8 phases of the moon, naming each phase. Use these words: reflected light, orbit, observe, position	**--Make a scale drawing of the planet Saturn.** Use the Earth to indicate the scale of the planet: "Saturn's diameter is about 9 times as big as the Earth's diameter." Students choose another planet and determine the approximate scale to the Earth. --**Match pictures** of the planets with their names. Place in order from the sun and report out orally.	**--Make a t-chart:** Fact | Opinion Write information on sentence strips—ex: *The earth is round. The earth is the only planet with water. The tides are caused by the gravity pull of the moon.* Students place strips in one column and orally defend their choice.	**--Class project—** assign one of the eight planets to each team. Students research planet in informational books, or websites: www.windowstotheuniverse.com . **Record information** in science journals. --**Make a model** of the planet and **report out information** to class

Michigan Science Linking Document to English Language Proficiency Levels

6th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Grade 6 Discipline 1: Science Processes					
Standard: Inquiry Process (IP) Observing, Questioning, Investigating, Developing Solutions	**-- Draw scientific pictures** and label them (such as forms of energy—light, sound, electrical, or producers, consumers, decomposers)	**-- Conduct scientific investigations** using realia. Following teacher directions.	**--Generate** list of questions about observations --Use question words such as who, what, when, where, why, what if…	**--Maintain** a science journal	**--Maintain** a science journal with explanations, and label illustrations
Standard: Inquiry Analysis and Communication (IA)	**--**With a partner, **investigate** an interesting science topic (electrical energy, ecosystems, prey-predators, etc.) and discuss --Draw a poster and label topics with simple sentences	**--Chart** observations using a T list	**-- Explain T-list** to another team investigating the same question -- Discuss findings and combine into one team chart	**--Write** one paragraph about investigation findings	--**Research** answers to question using books, internet, experts and add to writing
Standard: Reflection and Social Implications (RS)	**--Construct a thinking map or ecosystem model** (producers/consumers, predator/prey, etc.	--**Follow 3-4 step directions** and then restate construction directions for another student to follow	--**Develop questions** about model	**--Read about** ecosystems and rocks	**--Create** a book of rocks, listing types, where found, and many uses of each kind of rock

6th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Grade 6 Discipline 2: Physical Science					
Standard: Energy (EN) Kinetic and Potential Energy Energy Transfer	--**Experiment** with heat, motion and food energy—rubber band stretching, rolling ball—noting the differences between kinetic—in motion—and potential (ball on a ledge) --**Observe or view a film** about radiation, conduction of electricity, or convection ovens --**Label** kinds of energy on a picture collage	--**Construct a circle thinking map** defining energy and the different kinds**—** potential, kinetic --**Draw a picture or act out** how energy is transferred without loss or gain of energy	-- **Write 3 sentences** about kinetic and potential energy using examples from life --**Discuss** what happens	--**Explain** how potential energy and kinetic are related through real-life examples	--**Research** radiation or convection ovens, and write a 3 paragraph summary on its uses to help mankind
Standard: Changes in Matter (CM) Changes in State	**--Observe and identify** how matter (ex: water) changes through heating and cooling --Use sequence words to describe change. (First, the water is cold. Next, the water is boiling. Finally, the water is cooling down.	**--Discuss** differences between physical and chemical changes with many examples from nature (ex: water freezing into ice (physical); iron and oxygen form rust (chemical)	--**Experiment** with water evaporation, condensation, and freezing --**Write sentences** using stem to show both physical and chemical changes in matter: "If you…then you will …., but you…" Ex: "If you melt ice cubes, then you will have a puddle, but you will still have water."	--**Discuss, write, illustrate** observations in science journals	**Listen to "Science through Song"** by Jim Walters **Create** a song or poem about changes in matter—use the terms *motion, changes, atoms, molecules, structure, conserve, mass, arrange*

6th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Grade 6 Discipline 3: Life Science					
Standard: Organization of Living Things (OL) Producers, Consumers, and Decomposers	--**Sort pictures** of living things into producers and consumers --**Make a chart** using magazine pictures of producers, consumers, and decomposers	**Act out a scene** from nature depicting a producer, consumer, and a decomposer— "I am a potato plant. I produce tomatoes for my farmer. " "I am a farmer. I eat the potatoes from the garden but throw away the skin into the compost."	--**Construct a tree map** of the classification for all life forms into: **Life forms**  	-- **Appraise** which you would like to be—a consumer, producer, or a decomposer and state orally why	--**Write a short essay** on Producers, Consumers, and Decomposers and Energy
Standard: Ecosystems (EC) Interactions of Organisms Relationships of Organisms Biotic and Abiotic Factors Environmental Impact of Organisms	**--View a short film** about ecosystems in the Great Lakes – **--Say one sentence** about each	--**Match pictures** of predators with their prey --**Choose one predator** from the Great Lakes and **research**; use these words in sentences: *predator, prey, producer, consumer, adapt, benefit, interdependency*	**--Discuss** how human beings sometimes upset ecosystems because of urban expansion—ex: plight of the coyote --**Compile a list** of species near extinction because of overpopulation. State: "This _____ is extinct because _____."	**Compile a vocabulary book of Ecosystem terms—** listing word, illustration, sentence	--**Write 3 paragraphs** about how global warming is affecting the ecosystems of the Great Lakes region
Grade 6 Discipline 4: Earth Science					
Standard: Solid Earth (SE) Soil Rock Formation	**--Observe and compare** soil samples. **Work with a partner to describe** them with simple	**--View** video of plate tectonics. **Construct** a puzzle model of panagea" using simple shapes of	**Make a poster** of the rock cycle with labels identifying process of forming igneous, metamorphic, and	**Write a paragraph with a main idea with supporting details** showing evidence of the theory of plate tectonics	**Explain** the importance of the magnetic field related to scientific discoveries and inventions

6th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Plate Tectonics Magnetic Field of Earth	adjectives	continents. --**Describe** movement using direction words (north, northwest, etc.)	sedimentary rocks. --**Present to others** with a partner.		
Standard: Earth in Space and Time (ST) Fossils Geologic Time	**--View** a video clip about stars and why stars are different colors. Make simple statements about a star and its color. ("This star looks blue because…..." --**Look** at pictures of the constellations --**Illustrate** how constellations got their names	**--Create** scientific models based on illustrations and teacher directions: "Show how the moon goes around (rotates) the earth." "Show how the earth moves around the sun." --**Read with a partner** the book "Millions of Years Ago" by Steve Moline --**Discuss differences** between the land a million years ago and now	**--Use** a double-bubble thinking map to **compare and contrast** the sizes of objects in the sky—"The sun is bigger than the biggest planet." --**Create a double-bubble thinking map** comparing life forms today and those found in fossils from years ago	**--Make** a Space book of terms with illustrations and one sentence with each—orbit, spin, year, cycle, moon, movement, sun, sky, day/night, etc. --**Locate places** on a world map where recent fossils have been found --**Write a mini-report** about one fossil	**--Create a non-fiction book** about object in the sky or creature that lived long ago. Include content page, index, headings, diagrams, maps, pictures, labels, etc. --**Share** with kindergarten class

Michigan Science Linking Document to English Language Proficiency Levels

7th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Grade 7 Discipline 1: Science Processes					
Standard: Inquiry Process (IP) Observing, Questioning, Investigating, Developing Solutions	**-- Draw scientific pictures** and label them (such as forms of energy—solar, waves, chemical), cell formations, the water cycle	**-- Conduct scientific investigations** using realia. Following teacher directions.	**--Generate** list of questions about observations --Use question words such as who, what, when, where, why, what if…	**--Maintain** a science journal	**--Maintain** a science journal with explanations, and label illustrations
Standard: Inquiry Analysis and Communication (IA)	--With a partner, **investigate** an interesting science topic (chemical energy, cells, photosynthesis. weather and climate, etc.) --**Draw and color a picture** to demonstrate learning	**--Chart** observations using a T list	**-- Explain T-list** to another team investigating the same question -- Discuss findings and combine into one team chart	**--Write** one paragraph about investigation findings	--**Research** answers to question using books, internet, experts and add to writing
Standard: Reflection and Social Implications (RS)	**--Construct a thinking map or matter model** (elements and compounds, water cycle, etc.)	--**Follow 3-4 step directions** and then restate construction directions for another student to follow	--**Develop questions** about model	**--Read about** weather and climate, the water cycle, solar energy	**--Create** a book of weather, listing types, where found, the many consequences of weather, and man's solutions to capturing and taming weather

7th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Grade 7 Discipline 2: Physical Science					
Standard: Energy (EN) Waves and Energy Energy Transfer Solar Energy Effects	--**Experiment** with sound and light waves --**Bring in** different objects (e.g. nails, tuning forks, drum). --**Make predictions** about the sound that each object will make when struck. --**Discuss** the length of the vibrations. --**Chart** on paper and make comparative statements ("This sound is louder than that one.")	--**Construct a circle thinking map** defining the different kinds of waves –sound, seismic, water—add a representative picture of each kind --**Draw a picture or act out** how light energy is transferred to chemical energy through the process of photosynthesis --Listen to the "Energy" song from Science through Song by Jim Walters	-- **Experiment** with a "slinky" to discover how waves move --**Read or view a video** about nuclear energy, specific to nuclear reactions in the sun --**Compare** the difference between "tiny fraction" of light energy and catastrophic accidents with nuclear energy	--In science journals, **make a list** of "I wonders" about solar energy	--**Research** about one of the "I wonders" about solar energy using an encyclopedia, science leveled books, or the internet --**Write 3 paragraphs** about findings, including uses of solar energy
Standard: Properties of Matter (PM) Chemical Properties Elements and Compounds	**--Gather common** substances from around the classroom and house. --**Classify substances** by boiling point, density, color, conductivity and reactivity. Use descriptive words:	--**Construct** a chart of the Periodic Table, labeling each element with name and symbol. Color code element families --**Explore real examples** of common elements: calcium, magnesium,	**--Read information** about the history of the Periodic Table --**Visit website**: www.periodictable.com --**Make a flow chart** or time table of the history of the Periodic Table --**Orally present** chart to class	--**Use Periodic Table** to discover similarities and differences in elements --**Construct a double-bubble thinking map** to show similarities and differences between two elements	**--Research and write** an informational book about one element from the Periodic Table: include illustrations, properties, history, uses, charts, etc. --**Report out** to class

7th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low** **Intermediate** **ELP Level 2**	**High** **Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
	"This metal conducts electricity, but this plastic tube does not conduct electricity."	copper, nickel, zinc, tin, iodine, lead, gold, hydrogen, chlorine, etc. --**State one sentence** about each element and its uses and identify its place on the periodic table			

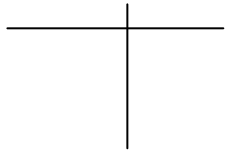
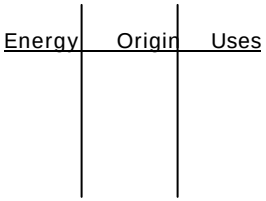
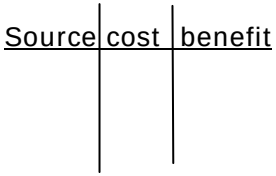
7th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Standard: Changes in Matter (CM) Chemical Changes	**--Observe, discuss, and identify** how matter (ex: water) changes through heating and cooling --Listen to the song "Molecular Motion Dance" from the Science through Song" CD by Jim Walters --Physically dance out the motions described	**--Discuss** differences between physical and chemical changes with many examples from nature (ex: water freezing into ice (physical); iron and oxygen form rust (chemical)	--**Experiment** with evaporation, gas formation, color and temperature change using water and other chemicals (ex: steel wool added to water, steel wool added to a vinegar and bleach mixture) --**Write one or two sentences** describing the substance before and after the chemical change: Before-- "The steel wool is silver in color and rough in texture. It stays together when rubbed." After—"The steel wool is tan, rusty in color and is rough in texture but it crumbles when rubbed."	--**Discuss, write, illustrate** observations in science journals	**Listen to "Science through Song"** by Jim Walters **Create** a song or poem about changes in matter—use the terms *formation, chemical changes, number of atoms, same, different, mass, products, reactants*
Grade 7					

7th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Discipline 3: Life Science					
Standard: Organization of Living Things (OL) Cell Functions Growth and Development Photosynthesis	--**Construct a tree thinking map** of systems: Cells →tissues →organs →systems --**Illustrate and label chart** of blood, muscle, or nerve system in the human body	--**Give a short oral summary** of chart, including cell parts: nucleus, cell wall, cell membrane and specialized functions of cells (respiration, synthesis, mitosis, meiosis) --**Listen to** "Cell Membrane Mambo" by Jim Walters. Act out	**--Make a 3-D model** or act out the three functions of cells—how they acquire and use energy, grow and reproduce --Demonstrate that cell growth is an increase in the numbers of cells, not change in size—draw and label examples. Compose two	--**Listen attentively and take notes** on a media presentation of photosynthesis --**Visit website** for an interactive display of cells: www.cellsalive.com --**Synthesize information and report orally** to class 3 fascinating facts	--**Construct a double-bubble thinking map** illustrating the differences between cellular respiration and photosynthesis --**Explain differences** in a three paragraph essay --**Compose a poem, play, or Reader's Theater**
Standard: Heredity (HE) Reproduction	--**Discuss** characteristics that you have inherited from your mother or father (eye color, hair color, height, etc.) --Use words like: "I am taller than my father." "I have my mother's brown eyes, but black hair like my father."	--**Discuss** the characteristics of all living systems and how they are passed on through generations --**Discuss** what life would be like if life forms did not reproduce	--**Read about** examples of sexual and asexual reproduction	--**Construct a double-bubble thinking map** comparing and contrasting the advantages and disadvantages of sexual vs. asexual reproduction --**Report out findings**	--**Choose one animal** and trace characteristics through 100 years. **Record changes** and if they were due to heredity or environmental adaptation
Grade 7 Discipline 4: Earth Science					
Standard: Earth Systems (ES) Solar Energy	--**Use a picture or diagram to label** and identify the different parts of the water	--**Discuss** causes and effects of human activities on plants and animals. Use	**--Read about** global warming and the increase of hurricanes. -- **Construct a chart**	**--Keep a weather journal.** Use the following table **Date** | 9/18	**--Research** global warming and its effect on climate and weather. –**Write and illustrate** a

7th Grade **Science Discipline**	**Basic** **ELP Level 1A**	**Basic** **ELP Level 1B**	**Low Intermediate** **ELP Level 2**	**High Intermediate** **ELP Level 3**	**Proficient** **ELP Level 4**
Human Consequences Weather and Climate Water Cycle	cycle. Include the warming of the sun in the cycle. --**Read** "A Drop of Water" by Dr. Wageh Saad or similar book about the water cycle --**Listen to** "Water Cycle" on the Science through Song CD by Jim Walters	these words: extinction, variety, climate change, endangered species, acid rain, survival	of the number of hurricanes in the United States over the last 5 years—include location, size, date, etc.	**Time** 10:00 **Temperature** 82 **Wind direction** NW **Barometric pressure** **Precipitation type** rainy **Humidity** high **How I felt** Muggy, droopy	pamphlet on ways to prevent further damage to our planet
Standard: Fluid Earth (FE) Atmosphere	--**Demonstrate information** about the atmosphere using magazine photos, internet pictures, drawings, objects to represent gasses, etc. Use sentence frames—"This photo/object shows…." Use these words: nitrogen, oxygen, mixture, water vapor, gases	--**Illustrate** composition of the atmosphere at 3 different elevations—Temperature decreases as altitude Increases—show on a thermometer and by scenery --**Report out** illustrations	--**Read leveled books** about Earth's atmosphere, the "greenhouse effect", weather in different parts of the world	**--Using a double-bubble thinking map** compare atmospheres at 3 different elevations. Show causes and effects --**Report out** information	**--Research** "Greenhouse effect" **--Construct** a brochure about the information gathered and how people can lessen the effects of the greenhouse effect

High School—Earth Science Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard E1: Inquiry, Reflection, and Social Implications					
Standard E1.1: Scientific Inquiry Questioning, Evaluating, Investigating, Identifying Patterns Describing Reasons	**-- Draw scientific pictures** and label them (such as atmosphere, rocks, renewable energy, greenhouse effect, landforms, etc.) **--**With a partner, **investigate** an interesting science topic (greenhouse effect, weather and climate, carbon dating, etc.). **Choose** one picture to label and **describe** with two prepared sentences.	**-- Conduct scientific investigations** using realia. Following teacher directions. **--Chart** observations using a T list	**--Generate** list of questions about observations --Use question words such as who, what, when, where, why, what if… **-- Explain T-list** to another team investigating the same question -- Discuss findings and combine into one team chart	**--Maintain** a science journal **--Write** one paragraph about investigation findings	**--Maintain** a science journal with explanations, and label illustrations --**Research** answers to question using books, internet, experts and add to writing
Standard E1.2: Scientific Reflection and Social Implications Critiquing Identifying Personal	**--Construct a thinking map or matter model** (landforms, types of rocks, solar system, etc.)	--**Follow 3-4 step directions** and then restate construction directions for another student to follow	--**Develop "I Wonder" questions** about model ("I wonder if we will discover another kind of landform.")	**--Read about** weather and climate, renewable energy, the "greenhouse effect"	**--Create** a book of weather, listing types, where found, the many consequences of weather, and man's solutions to

High School—Earth Science Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
and Social Issues Accessing Information Discussing Evaluating Careers in Science Fields					capturing and taming weather
Standard E2: Earth Systems					
Standard E 2.1: Earth Systems Overview Geosphere Atmosphere Hydrosphere Biosphere	**--Draw or construct a model** of the Earth as a system with interacting components: a gyroscope model or gear model where the atmosphere is represented by one gear or link, the geosphere by another and the biosphere by another, all interlinked. State: "The Earth is a closed system of matter."	--**Label each part** of the model, **stating** "This represents the geosphere which is the crust, mantle and core of the Earth." This part represents the atmosphere which is the air surrounding Earth." This part represents the biosphere which is all the living parts of Earth, including plants and animals."	**--Write 3 sentences** about each component of the Earth, using words like: interact, movement, form, change	**--Compile a vocabulary book** of Earth System terms—listing word, illustration, sentence describing each of the four major interacting components	--**Choose one** of the interacting components of Earth's systems and explain orally and in writing why it is the most important one to humans and what we must do to preserve and conserve. --**Report out** to classmates.
Standard E 2.2: Energy in Earth	**--Sort pictures** of energy forms	**--Show illustrations,**	**--What do you use for everyday**	**--Appraise** which form of energy form	**--Research** one renewable source of

High School—Earth Science Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Systems Renewable and Non-renewable sources of energy	into renewable or non-renewable sources 	**real life examples, and demonstrate** these heat transfer methods: Conduction Convection Radiation	**living?—list and chart:** 	your family uses most—renewable or non-renewable and state orally why	energy **and write a short essay** on advantages for your family to use this form of energy
Standard E2.3: Biogeochemical Cycles Carbon	**--Collect pictures and real objects** of things that contain carbon **--Sort into the different carbon forms** (solid like in a rock, gas like in carbon dioxide, life like in animals, etc.)	**--Select pictures** that show carbon forms that are beneficial and carbon forms that are harmful to humans **--Orally defend** your choices	**--Illustrate and write 3 sentences** what life on earth would be like without carbon. Explain why	**--Research one –** deforestation, carbon dioxide from fossil fuels, rain forests --**Write a paragraph** about why it is important to humans or why it is harmful	**--Write a letter to a state representative or senator** stating why we need more fuel efficient or electric cars
Standard E2.4: Resources and Human Impacts on Earth Systems Costs and benefits of renewable and non-renewable sources of energy Ozone depletion	**--List** all the sources of energy in your own house—ex: electricity, gas, wood, propane, etc. **Decide** which is the most efficient and **write/say one sentence** to give a reason why. ("Our refrigerator is efficient because it is two years old.'	**--Find out where** your main source of energy to heat and cool your house comes from (gas company, electric company) and where they get the fuel **--Look at** your home heating bill and determine the cost per kilowatt hour. **--Compare** with classmates and make a bar graph.	**--Chart out** sources of energy, costs, benefits and whether source is good or bad for the Earth 	**--Choose one human activity** (deforestation, air pollution, water pollution, fossil fuel use, etc.) that is the most detrimental to the Earth—**defend your choice**, and how it has impacted negatively on the landscape, air, quality of life, etc. Report out to classmates	**--Research** one recently new renewable energy source. Include why it is cost effective and beneficial for Michigan—possible sources are wind energy and wave energy

High School—Earth Science Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard E3: Solid Earth					
Standard E3.1: Advanced Rock Cycle Rock cycle and plate tectonics	**--Collect** various rocks from outside school and house. **--Arrange** according to type: igneous, metamorphic, and sedimentary	**--Chart rock types** and whether influenced by plate tectonics or climate Rock — influenced by Igneous Metamor. Sediment.	**--Write descriptive sentences** about each type of rock. Include how they can change from one type to the other (by cooling and crystallization, weathering and erosion, sedimentation and lithification, etc)	**--Research** the most common rocks in Michigan—what kind, and why they are common to Michigan	**--With a partner, write illustrate, and demonstrate** the rock cycle and how it relates to plate tectonics
Standard E3.2: Interior of the Earth Crust, mantle Inner and outer cores Magnetic field of the earth Oceanic and continental crust	**--Build a model** of the earth (from clay, Styrofoam, etc.) and label with key vocabulary—core, mantle, crust. (Website for great paper models of the Earth: www.usgs.gov/education/learnweb/ice.	**--Talk about crust** in relation to "the crust of the bread, the crust on a bowl of soup after it has cooled in relation to the crust of the Earth—both are a thin layer **--Discuss** the Earth's liquid core similar to the boiling soup. It also contains iron and generates the Earth's magnetic field.	**--Experiment with a bar magnet** to experience a "magnetic field"—place iron filings on an overhead. Watch as the filings are attracted to the magnetic poles. Explain to a partner. --**View and discuss a video** on the Earth's inner and outer core and the magnetic field of the Earth http://education.gsfc.nasa.gov	**--Partners demonstrate** Primary (P) and secondary (S) seismic waves by using a slinky using a push-pull movement (along the slinky to another person (P wave) and an up-down movement (S wave) that moves through rocks. **--Explain to your partner how** this is like the seismic waves on Earth. Scientists can find out what the interior of the earth is made up of by the wave patterns.	**--Create a 3D image** of Earth's crust –showing high mountains (thicker and less dense crust) and the ocean's thinner and more dense crust **--Experience** the weight, smell, and feel differences between basalt and granite stone. --**Report out** the differences in terms of density and weight **--Explain** the difference between oceanic and

High School—Earth Science Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
					continental crust using these words—crust, dense, basalt (oceanic), granite (continental)
Standard E3.3: Plate Tectonics Theory Features and processes that occur Plate boundaries Direction and rate of movement	**--Demonstrate** plate tectonics using two stacks of paper plates suddenly pushed together—some flip out, others create a "mountain", while others create a split—like what happens in an earthquake	--**Demonstrate and explain** shift--one stack of paper plates colored brown on a table (continental crust) and paper plates colored blue (oceanic crust) spread all over the table. Shake the table to represent earth movement: shows sea floor spreading, mid-ocean ridges, mountain ranges, etc.	**--Experiment** with acetate sheets melting and cooling—relate this increased density experience to plate tectonics	**--Construct a Pangaea flip book** showing the continental drift throughout time on Earth from millions of years ago to the present configuration of continents. Report out with a partner, while flipping the pages—"This is the Earth 180 million years ago. It shows that …."	**--Research** the Marianas Trench (Earth's deepest trench) or Alfred Wegener (continental drift theory). --**Write an essay,** explaining the significance of the place or the person in man's understanding of the Earth
Standard E3.4: Earthquakes and Volcanoes Distribution of earthquakes and volcanoes Effects Elastic rebound theory	**--Use a graphic organizer to compare** earthquakes and volcanoes, detailing the differences and how they are the same (destruction) --Write and say	--**Read about** earthquakes and volcano eruptions from the last 5 years. **--Locate their positions** on a globe or map **--Report out** their distribution. "There are more	**--Make a glossary (including an illustration and a sentence)** of the following terms: earthquake. Volcano, eruption, fault, continental drift, magnitude, Richter scale, plate tectonics, plate	**--Read about** one recent earthquake **and report out** size, duration, human cost and material costs	**--Using the website** www.earthquake.usgs.gov research earthquakes in the US over a 5 year period: 1. Damage 2. Deaths 3. Largest by state

High School—Earth Science Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
	one sentence about each. ("The earthquake and the volcano are the same/are different because…."	earthquakes on _____ then on _____. This is because of the plate boundaries."	boundary, seismicity, seismic, seismograph		4. Largest overall 5. Magnitude of 7.0+ **--Present findings** in interesting ways using visual aids. Include explanation of plate tectonics and their motions.
Standard E4: Fluid Earth					
Standard E4.1: Hydrogeology Surface water Ground water Water quality	--**Collect pictures** of various fresh water scenes **-- Label the water resources.** **--Point and say how they are alike and different using pictures or a graphic organizer:** lakes, rivers, wetlands, glaciers, ground water, etc.	**--Make a model** of an aquifer using coffee filters, modeling clay and water. Explain how an aquifer works in real life.	--**Diagram** the % of freshwater on Earth in comparison to salt water. Tell where we get fresh water and why it has diminished over the years.	--**Use a world map and label** it with the 20 river systems of the world. --**Research and collect data** on 1 or 2 interesting river systems --**Research** one of the Great Lakes and **report out** how pollution has effected it	**--Research** the Rouge River and give an oral presentation including illustrations, uses, and how it has changed over the years (water quality)
Standard E4.2: Oceans and Climate Currents Global and regional climate	--**View a video or map** showing ocean currents on the surface and deep water currents. --**Compare** the differences using a map, gestures, and simple	--**Read an article and discuss** how scientists are capturing the ocean's waves to produce energy (October 2008 Popular Science)	**--Construct a vocabulary book,** including illustrations, personal definitions and a sentence for each term: water current, prevailing winds, Coriolis effect, temperature	**--Experiment** with throwing a ball from the center of a moving merry-go-round—demonstrates the Coriolis effect. --**Research** how the Coriolis effect prompts airlines, weapons deployment, and	**--Research** the Great Lakes and how Michigan climate is influenced by these large lakes. Report out in essay form.

<table>
<tr><th>High School—
Earth Science
Essentials</th><th>Basic
ELP Level 1A</th><th>Basic
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Intermediate
ELP Level 2</th><th>High
Intermediate
ELP Level 3</th><th>Proficient
ELP Level 4</th></tr>
<tr><td></td><td>sentences. (“This current moves faster than that one.”)</td><td></td><td>basin, climate zones, boundary currents, thermohaline circulation, evaporation, precipitation</td><td>other activities to adjust their calculations. Report out orally</td><td></td></tr>
<tr><td>Standard E4.3:
Severe Weather

Thunderstorms
Tornadoes
Hurricanes
Floods
Waves
Droughts
Weather safety</td><td>--Use newspaper, internet and magazine pictures to chart time and places of hurricanes, tornadoes, floods, tidal waves, and droughts around the world
--Construct and label a chart</td><td>--Keep a weather journal. Use the following table:<table><tr><td>Date</td><td>10/15</td></tr><tr><td>Time</td><td>10:00 am</td></tr><tr><td>Temp.</td><td>54°</td></tr><tr><td>Wind Dir.</td><td>NW</td></tr><tr><td>Barometric Pressure</td><td></td></tr><tr><td>Precipitation</td><td>drizzle</td></tr><tr><td>Amount</td><td>½”</td></tr><tr><td>Humidity</td><td></td></tr></table></td><td>--Read Wild Weather leveled books with a partner
--Write 3 sentences describing each kind of severe weather—where they usually occur, what happens, how it sounds, etc.</td><td>--Research safety rules for each severe weather
--Write a list of things (in priority order) you would do if you were caught outside in severe weather</td><td>--Write a newspaper article describing the damage of Hurricane Ike, or a local tornado—include material damage and impact to local government services, electrical and water services</td></tr>
<tr><td>Standard E5
The Earth in
Space and Time</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Standard E5.1:
The Earth in
Space

Position and Motion
Scale, Structure and Age of the universe</td><td>--View a video clip about the universe (Carl Sagan, NASA)</td><td>--Construct a scale model of the universe (cardboard, balls, paper, etc). Show our solar system in relation to the whole universe and earth in relation to the other planets and the sun</td><td>--List questions about the universe—use who, what, when, where, why, how, what if</td><td>--Read various scientific articles, books, magazines about the universe and report out interesting facts and pictures</td><td>--Research one question about the universe using articles, websites, videos
--Compose an interactive presentation on the topic</td></tr>
</table>

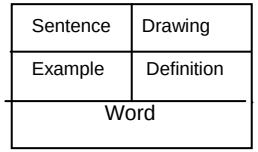
High School—Earth Science Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard E5.2: The Sun Solar activities Auroras Power grid disturbances Nuclear fusion	--**Sort pictures** of sun activities into sunspot cycle, solar flares, solar wind --**Show similarities** to cycle, flares, wind	--**View videos** on solar activities (ex: "Frequency"—disruption of radio communication, and auroras, etc.) --**List phenomena shown** (auroras, solar flares, etc.)	**--Investigate** www.nasa.gov –The Sun (illustrations, articles, videos, etc.) **--Report out 3** interesting facts	**--Illustrate and write** a fiction piece on what life on Earth would be like without the Sun	**--Research** nuclear fusion: what it is, what it can do **-- Take a stand—**Is nuclear power the answer to the energy crisis?
Standard E5.3: Earth History and Geologic Time Age of our solar system Radioactive decay Events in Earth's history Index fossils	**--View video** on the formation of our solar system www.windowsucar.edu --**Sort pictures** into a time sequence	**--Construct a time line** of Earth's history—include illustrations, what happened, where oxygen formed, man came into being, ice age	--**Explore outside** on a "archeological dig" for rocks, fossils and bring back samples to the classroom --**Guesstimate** age of rock or fossil	**--Read leveled books** about the creation of our solar system, the geological times of earth, etc. **--Report out** interesting facts	**--Explore** radioactive decay and elements and how man uses them for good (dating rocks, medicine, etc. **--Report out information** in a creative way (demonstration, video, poster…)
Standard E5.4: Climate Change Greenhouse effect Emissions Global temperature	--**View videos** on the "greenhouse effect" and global warming --**With a partner, identify and list** causes Resource: www.pbs.org --**Report out** interesting facts using visual supports	--**Survey classmates**—"How can we lessen the greenhouse effect in this school?" **--Create a list and prioritize** which can be easily accomplished in a year	**--Construct a visual glossary of terms**—include illustration, sentence, definition, symbol, uses, and rate as good or bad for mankind: Water vapor Carbon dioxide Methane Nitrous oxide Ozone Volcanic eruptions Sunlight Meteorite impacts	**--Make a graph** showing the rise in global temperature in relation to the rise in carbon dioxide from 1858-2008 **--Make a cause / effect chart** **Cause** | **Effect** Warmer oceans | algae growth Changing climate zones |	**--Write an essay** on what students can do to "green" this planet

High School Biology Essentials **Michigan Science Linking Document to English Language Proficiency Levels**

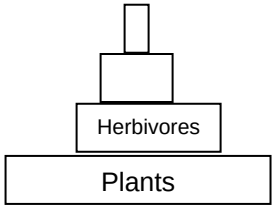
High School—Biology Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard B1: Inquiry, Reflection, and Social Implications					
Standard B1.1: Scientific Inquiry Questioning, Evaluating, Investigating, Identifying Patterns Describing Reasons	**-- Draw scientific pictures** and label them (such as atmosphere, DNA, photosynthesis, evolution, etc.) **--**With a partner, **investigate** an interesting science topic (ecosystems, genetics, DNA, evolution,etc.) and discuss	**-- Conduct scientific investigations** using realia. Following teacher directions. **--Chart** observations using a T list	**--Generate** list of questions about observations --**Use question words** such as who, what, when, where, why, what if… **-- Explain T-list** to another team investigating the same question -- Discuss findings and combine into one team chart	**--Maintain** a science journal **--Write** one paragraph about investigation findings	**--Maintain** a science journal with explanations, and label illustrations --**Research** answers to question using books, internet, experts and add to writing
Standard B1.2: Scientific Reflection and Social Implications Critiquing Identifying Personal and Social Issues Accessing Information Discussing Evaluating Careers in Science Fields	**--Construct a thinking map or DNA model** (photosynthesis process, cell growth and development, etc.)	--**Follow 3-4 step directions** and then restate construction directions for another student to follow	--**Develop "I Wonder" questions** about model ("I wonder if we will discover another kind of energy.")	**--Read about** atmosphere, DNA, photosynthesis, evolution, etc.)	**--Create** a book about photosynthesis, or genetics and **investigate** career fields related to them

High School—Biology Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard B2: Organization and Development of Living Systems					
Standard B 2.1: Transformation of Matter and Energy in Cells Transforming energy Photosynthesis Cell division, growth and development	**--Observe** what it means to "transform"—demonstrate with concrete objects: transforming a piece of paper into a crane or hat; transforming a piece of wood into a figure --**Listen to** "Cell Membrane Mambo" by Jim Walters explaining cell respiration, etc. through song	--**Construct a chart** of energy flow from the sun to plants, animals, humans, etc. **--Give a short oral summary** of chart using these words: sun, plants, photosynthesis, energy, transform, etc. **--Demonstrate** cell respiration by breathing hard on a pane of glass	**--Use a 3-D model or act out** the three functions of cells—how they acquire and use energy, grow and reproduce **--Demonstrate** that cell growth is an increase in the numbers of cells, not change of size—draw and label examples, compose one statement, etc.	**--Listen attentively and take notes** on a media presentation about photosynthesis **--Visit website** for interactive display of cells: www.cellsalive.com **--Synthesize information and report orally** to class	**--Construct a double bubble thinking map** illustrating the differences between cellular respiration and photosynthesis **--Explain** the differences **in a multi-paragraph essay** **--Compose a poem, play or Reader's Theater** about photosynthesis, cellular respiration, cell division
Standard B 2.2: Organic Molecules Carbon chains and rings Common elements Dehydration and hydrolysis	**--Demonstrate a carbon chain** by connecting paper clips together into a straight chain, branched chain, and a ring simulating carbon chains and a carbon ring. --**Form a sentence explaining** each joining: "Carbon atoms join in	**--Construct a chart** of the common organic molecules—C, H, N. O, P, S—include symbol, name, atomic mass, usefulness to man	**--Create a vocabulary book of terms--** including word, illustration, definition, sentence and symbol: molecule, carbon, element, organic, inorganic, carbohydrates, lipids, proteins, acids, etc.	--**Make an "Important Book"** about the 4 major categories of organic molecules—carbohydrates, lipids, proteins, and nucleic acids—using the same patterned sentences as in the book by Margaret Wise Brown	**--Research** dehydration **--Write a short essay** on the benefits and pitfalls of dehydration to man

High School—Biology Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
	chains and rings to form large and complex molecules."				
Standard B2.3: Maintaining Environmental Stability Cell function Stable internal environment Disease agents	**--Discuss** the word "stability"—demonstrate using a balance beam, or stable or unstable table --**Explain** that cells need a "stable" (homeostasis) environment in order to grow—ex: show what happens if a plant environment is too hot or too cold	**--List** the physical conditions that cells need in order to function properly—include how the condition helps: Ex: pH (acidity), temperature, etc.	**--Read about** acid rain—an instability in the environment that makes lakes and rivers too acidic to support life and can corrode stone **--Draw a picture** of the effects of acid precipitation --**Write one sentence**	**--Construct a T-chart with illustrations** showing the differences between a stable or unstable environment **--Write a paragraph** describing a stable environment for life	**--Research** one organism or plant in Michigan that has become endangered because of environmental instability (water pollution) or disease agents **--Report out** to class
Standard B2.4: Cell Specialization DNA Structural specializations	**--Sort pictures of** living things (plants, animals, other organisms) **--Choose** a picture and **say** a complete sentence to describe it.("This is an animal."	--**Build a 3-dimensional model of DNA** (use beads, clay, pipe cleaners, etc.) Pairs of students can show complementary base pairing **--Discuss—DNA is like… because** (ex: a recipe because it contains all the directions to build a body)	**--Pick three multicellular organisms**—a plant, an animal, and a fish**—create a chart** of how each one gets energy, breathes, and removes waste—what cells perform these tasks? **--Show** how these functions are basically the same	**--Draw a fish, a man, and a worm—orally describe** what each uses to breathe. **--Write a 3 sentence summary** stating that even though different organisms use different structural specializations (gills, lungs, membranes) they accomplish the same thing	**--Research one multicellular organism and orally report out** how organism functions—how it gets energy, how it obtains oxygen, how it digests food, how it reproduces, etc. **--Create an illustrated leveled book** using the information

High School—Biology Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard B 2.5: Lipids Major systems and processes working together Energy transfer	**--Match cards: name, example, characteristic:** Carbohydrate= energy or structure molecule **=**pasta Protein= contains nitrogen=eggs Lipid=does not dissolve in water= oil Nucleic acid= stores and transfers cell information= **--Practice repeating patterns of questions and answers with a partner.** Q: "What are all living things composed of? A: "Living things are composed of..."	**--Make a vocabulary chart for each word:**  Use these words: Organelles, cells, tissues, organs, organ systems, and organisms	**--Discuss the differences** between "transfer" and "transform" **--Illustrate and label** energy transferred from the Sun and transformed into energy during photosynthesis **--Write 3 sentences** describing how energy is transferred and transformed using the correct words	**--Describe** what happens when you eat an apple—breaking down energy-rich molecules to provide energy for cell functions	--**Create a song, rap, or poem** about the composition of living things
Standard B3: Interdependence of Living Systems and the Environment					
Standard B3.1: Photosynthesis and Respiration	**--Listen attentively** to a presentation about the	**--Make a diagram** illustrating energy conversions	**--Create a double bubble thinking map** of photosynthesis and	**--Make a book** illustrating the use of one plant by an animal, showing both	**--Research** one living organism (plant, animal, etc. of choice) and how it

High School—Biology Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Direct and Indirect energy from the sun Reactants and Products of Photosynthesis and Respiration	differences between direct and indirect—give examples like talking on the phone vs. talking directly to someone; differences between respiration and perspiration --Make a chart showing acquiring energy directly (sun to plant) and man eating a carrot (indirect from sun)	during photosynthesis and respiration **--Write both equations** for photosynthesis and cell respiration—have students notice the similarities and differences	cell respiration, showing differences and similarities, namely carbon dioxide and water converted into oxygen in photosynthesis and cells producing carbon dioxide and water in cell respiration	photosynthesis and cell respiration	uses photosynthesis and/or respiration to gain and use mass to thrive **--Report out findings** to class through an visual-oral presentation
Standard B3.2: Ecosystems Energy Storage Energy Transfer Flow of Energy	**--Listen attentively** to "Science through Song—Ecosystems" by Jim Walter **--Label pictures with** terms like storage, transfer, flow, food webs and orally identify each one with a sentence	**--Use AIMS materials** and play a food web game, demonstrating what happens to the energy flow when one organism is removed	**--Construct a flow thinking map** showing how energy is stored, transferred, lost as heat, etc.	**--Write a three paragraph essay** describing the flow thinking map	**--Research one food chain** that is part of a larger food web in Michigan (plants and animals) **--Illustrate and report out** in a leveled book format

High School—Biology Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard B3.3: Element Recombination Producers, Consumers, and Decomposers and Trophic levels	**--Discuss the terms** producer, consumer, decomposer—use illustrations and examples **--Sort pictures** of living things into producers and consumers, and decomposers and **say a sentence.** ("This lion is a consumer.")	--**Find pictures** from nature magazines **or act out a scene** depicting a producer, consumer, and a decomposer	**--Draw an energy pyramid** showing how energy transfers to the next level and also shows the heat loss at every level 	**--Write** a description of the energy pyramid, include percentages of energy transfer (about 10%) and energy loss	**--Draw an energy pyramid** of a Michigan food web **--report out** energy transfer and energy loss, **both orally and in writing.**
Standard B3.4: Changes in Ecosystems Ecosystem Stability Survival through Cataclysmic changes in the Environment	**--Discuss** how human beings and nature sometimes upset ecosystems: forest fires, urban expansion, floods, etc.—what happens?	**--View videos** on ecosystems instability—earthquakes, fires, floods, etc. **--**With a partner, **take interactive Ecosystems 15 item quiz:** www.pbs.org/earthonedge/quiz	**--Report out** interesting facts from quiz	**--Read about** cataclysmic changes to the environment – ancient (Ice Age) and more recent (Katrina or LA forest fires) **--Discuss** how the environment recovered, organisms that survived and those that didn't	**--Research** one negative human activity—overpopulation, deforestation, water pollution, trash, etc. **--Write one paragraph** on its negative impact **--Write one paragraph** on how we can change that trend
Standard B3.5: Populations Population growth Influences on population growth Consequences of invading organisms	**--Count the students in the class and graph** population over 3 days	**--List** the living things near the school—ex: trees, dogs, squirrels, etc. How do they interact with each other? **--List** things that	**--Plot the** population in Michigan over the last 10 years on a chart **--Discuss** the causes of the increase/ decrease	**--Research** one Michigan animal or plant that has become endangered because of an invading organism—ash trees, wolverine, eagle, elm tree	**--Make a leveled book** about the research project—include illustrations, causes, consequences, and solutions, if any

High School—Biology Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
		affect their population growth	in Michigan population in the last 2 years	**--Discuss** what happened, causes, and changes to environment	
Standard B4: Genetics					
Standard B4.1: Genetics and Inherited Traits Homologous Chromosome pair DNA molecule coding	**--Draw a family tree** focusing on one characteristic: hair color, eye color; shape of hands or nose; expanse of arm length. --**Illustrate and list** distinguishing characteristics passed on. **Say a sentence.** ("My mother has brown hair, and I do, too."	--**Examine** a three-dimensional model of DNA **–Discuss an example of codes** (barcode) and how this is like genes are <u>coded</u> in DNA to transmit information to pass on from parents to offspring	**--Discuss, write and illustrate sentences** using these words: DNA, genes, inherit, chromosomes, coding	**--Read** about Gregor Mendel and Barbara McClintock and their work in genetics and heredity **--Report out** 3 facts to class	**--Survey** your own family for inherited traits—what traits are passed on in your family from 2-3 generations? **--Write an essay, including a chart of inherited traits** traced back to family members
Standard B4.2: DNA Mutations Species DNA sequence Consequences of changes in DNA Radiation and Toxic Chemical exposure	**--Match** the DNA sequence to the species --**Demonstrate** DNA inherited mutations by a zipper—if correct zipper will function with ease—if teeth are "off" (mutation) then zipper (DNA) does not function properly. Say sentences like:	**--Build a model of DNA** out of beads, pipe cleaners, etc., **tell what each part** represents and the function	**--In small groups, research** one genetic disease—sickle cell anemia, Huntington's disease, Cystic Fibrosis, Hemophilia, Breast Cancer, etc. --include statistics on frequency, symptoms and effects, possible cures	**--Research** toxic chemicals or radiation poisoning --With a partner, **compose a 3 paragraph essay** on the causes and effects. Include the latest research on treatment	**---Write a reflective essay** on a genetic disease from personal experience—interviews, local newspaper articles—include facts, personal anecdotes, and synthesis of research **--Report out** highlights to class in a visual presentation, poem,

High School—Biology Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
	"This zipper is broken. The DNA sequence is broken."				personal narrative
Standard B4.3: Cell Division—Mitosis and Meiosis Process of Cell Division Mutations Identifying Genetic defects	**-- Act out** mitosis and its phases and meiosis, noting the differences **--Using a script, say** one sentence for what is happening at each phase	**--Illustrate** mitosis and meiosis, labeling each phase and item --**Write phases** on note cards with label of phase on reverse side, mix up and identify each phase	**--Make a vocabulary book of terms:** include an illustration, sentence, definition, symbol of --mitosis, meiosis, cell, mutation, genetics, gametes, offspring, gene, generation, parents, etc.	**--Make a poster** of a karyotype of cells—to identify genetic defects and **explain poster** to class **--Read** about the process of making karyotypes and the benefits to mankind	**--Research** stem cells, the uses and ethics of using them to solve serious medical conditions
Standard B5 Evolution and Biodiversity					
Standard B5.1: Theory of Evolution Natural Selection	**--Listen attentively** to a presentation of natural selection given with a visual **--View** natural selection PowerPoint and repeat what is happening at each stage: click on "biology" then "natural selection— www.worldofteaching.com	--With a partner, **select an animal** of choice and **replicate oral presentation** on natural selection	**--Read informational books** about the theory of evolution, and Darwin **--Report out** information learned	**--Make summary boards** on 4 major concepts of natural selection, including summary statement, illustrated example of each: 1. Overproduction: ex: deer population 2. Genetic variation: ex: longer legs on Arabian horse 3. Struggle to survive: ex: "survival of the fittest" 4. Differential reproduction—ex: Japanese macaques	**--Read about** the Hundredth Monkey—Japanese macaques who learned to wash potatoes and thus survive better **--Research** another animal that has thrived through time by adapting habits or physical characteristics

High School—Biology Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard B5.3: Natural Selection Population diversity Geographic isolation Evolution and Diversity of Organisms	**--View a video clip** of the Galapagos Islands, **listing** the variety of animals and plants	**--Make an evolution vocabulary book,** including terms, illustrations, definition, and sentences: evolution, natural selection, population, geographic isolation, genetic mutation, diversity, environment, genetic variation	**--Read about** genetic mutations in nature—a blue rose, albino tiger, mad cow disease, etc. --**List** questions—who, where, how, why, etc.	--in a team, **choose** one genetic mutation example or genetic variety, **research and answer questions** generated **--Report out** to whole class, using newscast format	**--Research** one Michigan type of tree, animal, plant, or fish listing population size, variety, evolution through 50 years, etc. **--Make into a multimedia presentation using scientific terms—** diversity, population, mutation genetic variety, etc.

High School Physics Essentials **Michigan Science Linking Document to English Language Proficiency Levels**

High School—Physics Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard P1: Inquiry, Reflection, and Social Implications					
Standard P1.1: Scientific Inquiry Questioning, Evaluating, Investigating, Identifying Patterns Describing Reasons	**-- Draw scientific pictures** and label them (such as atmosphere, DNA, photosynthesis, evolution, etc.) **--**With a partner, **investigate** an interesting science topic (ecosystems, genetics, DNA, evolution,etc.) and discuss	**-- Conduct scientific investigations** using realia. Following teacher directions. **--Chart** observations using a T list	**--Generate** list of questions about observations --Use question words such as who, what, when, where, why, what if… **-- Explain T-list** to another team investigating the same question -- Discuss findings and combine into one team chart	**--Maintain** a science journal **--Write** one paragraph about investigation findings	**--Maintain** a science journal with explanations, and label illustrations --**Research** answers to question using books, internet, experts and add to writing
Standard P1.2: Scientific Reflection and Social Implications Critiquing Identifying Personal and Social Issues Accessing Information Discussing Evaluating Careers in Science Fields	**--Construct a thinking map or DNA model** (photosynthesis process, cell growth and development, etc.)	--**Follow 3-4 step directions** and then restate construction directions for another student to follow	--**Develop "I Wonder" questions** about model ("I wonder if we will discover another kind of energy.")	**--Read about** atmosphere, DNA, photosynthesis, evolution, etc.)	**--Create** a book about photosynthesis, or genetics and **investigate** career fields related to them

High School—Physics Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard P2: Motion of Objects					
Standard P2.1: Position—Time Speed of an object Motion diagrams Position-time graphs Rotation and Revolution	**--Experiment** with racing toy cars of various sizes **-- Calculate** the average speed of each car	**--Create a chart** of the car race including car, size, distance, time elapse **--Orally report out** chart results	**--Make a vocabulary chart or book** of terms—include term, illustration, definition, sentence: average, position, elapsed time, rotation, revolution, velocity	**--Make a double-bubble thinking map** illustrating the difference between speed and velocity, and rotation and revolution **--Create a line graph** showing plots for distance (position) on the vertical side and time taken (elapsed) on the horizontal—do this for every car	**--Present orally and in writing** using a picture or globe, demonstrating the revolution and rotation of the Earth. --**Chart** the rotational and revolution speeds of all the planets
Standard P 2.2: Velocity--Time Variables: distance, displacement, speed, velocity, and acceleration Velocity-time graphs	**--View a video clip** of a horse or car race **--Listen to and watch attentively** a playback pointing to a picture of each term: distance, displacement, speed, velocity, and acceleration	**--Replicate oral presentation** on terms using object or pictures demonstrating each term	--**In teams, create a velocity-time graph** using calculations from toy car race **--Give an oral presentation** describing what happened with each car, using the graph	**--Experiment** with circular motion—hamster wheel, motorcycle in a circular cage (toy or on video clip), marbles on the rim of a round plate **--Orally describe** what is happening in plain terms and then in scientific terms—acceleration without a change of speed	**--**In teams, **create a song, poem, rap, or play** using these terms: velocity, time, distance, speed, acceleration, elapsed, etc. **--Present orally** to classmates

High School—Physics Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard P3: Forces and Motion					
Standard P3.1: Basic Forces in Nature Interaction of objects	**--Demonstrate** the difference between "direct" and "indirect" contact"—using objects **--Sort pictures** of real things demonstrating direct or indirect contact (tug of war, gravity, etc.)	**--View video clips** of forces of nature showing distant interaction (nuclear power, gravity, electromagnetism) **--State one sentence** of what is happening	**--In teams, choose** one contact sport and one non-contact sport and list the interaction of forces (ex: football and bowling) **--Orally explain** the forces in relation to direct or distance contact	**--Read leveled books** about forces in nature, mechanics (push-pulls, friction), etc. **--Write a paragraph** about favorite book	**--In teams, write a script and act out a play** about interaction of objects, demonstrating direct and indirect interactions
Standard P3.2: Net Forces Magnitude of every day forces Calculate net force	**--Illustrate multiple meanings** of these words: net, magnitude, direction, act	**--Write** one sentence using the scientific meaning of each word	**--Experiment** with various forces (tug-of-war, tractor pull, sports, hand springs) in different situations (in mud or water, lots of friction to no friction) **--Present** net force of 0 and **explain why** and present a net force of 5 and **explain how calculated**	**--In teams, choose one sport,** list all the forces acting upon the object (bowling--pins, swimming--body, hockey—puck, etc.) **--Create a poster** that demonstrates net force and **present orally** to classmates	**--Research** Newton's First Law of Motion **--Make a poster** and orally present findings
Standard P3.3: Newton's Third Law Action and Reaction force	**--Listen attentively** to demonstrations or video clips showing action and reaction	**--Create a T chart** of actions-reactions, using pictures, every day events, or observations	**--In partners, act out** charades of every day events—have other teams guess what the action is and name	**--Read** about Newton's laws **--Write** a paragraph about interesting facts	--In teams, **create a song, poem, rap, or play** about Newton's Third Law

High School—Physics Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
	(jumping off a boat and the boat moving back, dog wagging tail and tail wagging whole dog, etc.) **--State** the action and reaction	**--Report out 3 events**, stating what is happening, the action and then the reaction	the reaction (ex: hitting a ball, shooting a gun and gun backfiring, etc.)		
Standard P3.4: Forces and Acceleration Changes in motion Solving problems Objects moving in uniform circular motion	**--Working in teams-- experiment** with suspended steel marbles on wires game--hitting one ball into others, hitting 2 balls into others, etc. **--Report out orally** stating exactly what happened using sequence words such as first, second, next….	**--Act out** motion, acceleration, mass, force, velocity by loading a cart with weights in increments and **predict** change in speed **--Use** this sentence frame: "I predict that the cart will move slower/faster because…"	**--Predict** which object will fall to the ground first—an apple or a watermelon **--Weigh** both objects and **solve problem** using Newton's Second Law—F = m x a **--Experiment** with other objects	**--Create a leveled book** about Forces and Acceleration—illustrated or use pictures from magazines showing examples from real life **--Write sentences** explaining what is happening: Acceleration and motion, constant velocity, circular motion	**--Read about** pollution and the size of cars **--Write a report** comparing two cars: their mass, engine size and fuel usage, including personal car choice and reasons why
Standard P3.6: Gravitational Interactions Earth-Moon interaction Weight differences	**--Listen attentively to a presentation** or video clip on orbiting (spaceship or moon orbiting the Earth)	**--Retell** in scientific terms what is happening-- "The moon is orbiting around the Earth in a circular motion." "Centripetal force is the unbalanced force that causes the moon to in a	**--View** the historical walk on the moon **--Talk about** gravity on Earth and gravity on the moon—**predict** if you would weigh more on Earth or on the moon	--In teams, **make a list of curiosity questions** about gravity using starter question words—Is, Does, Who, When…. **--Give questions** to another team to answer	**--Research** gravity on various planets **--Report out** findings in chart form or a song or rap—include gravitational force, distance, mass

High School—Physics Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
		circular path."			
Standard P3.7: Electric Charges Variation of electric charges Static charge	**--Watch a demonstration** of an electrically-charged comb that picks up confetti **--Listen attentively and repeat words after teacher or classmate. Make flashcards with a self-designed sketch or picture:** *charge, force, gravity, electric, static, distance*	**--Demonstrate** other examples of static charge, and **predict** which will give the strongest charge—walking across a carpeted floor and touching a metal doorknob, clinging clothes out of a dryer, rubbing a glass rod with a silk cloth, pulling off cap	**--Act out** oppositely charged objects attracting each other and like charged objects repelling each other. Vary distance to less attraction, more attraction. **--In teams,** explain what is happening using scientific terms	**--Research** Charles Coulomb (1736-1806) **and write a paragraph** about his contribution to science—Coulomb's Law	**--Create a poem or rap** of Coulomb's Law **and act out** **--Research** the side effects of static electricity in high-technology labs **—Report out** problems and solutions
Standard P4: Forms of Energy and Energy Transformations					
Standard P4.1: Energy Transfer Energy transfer diagrams Everyday energy transfer activities	**--Cut out pictures** from magazines showing energy use **--Describe** the energy in one or two words (radio, heat, light, microwave, etc.)	**--Demonstrate** how a wave works (travels, things on the water bob up and down—transferring energy) **--Label** the energy in terms of waves: radio waves, heat waves,	**--In teams, explain orally** how one type of wave transfers energy: ocean wave, radio wave, microwave, sound wave, light wave	**--Read leveled books** about energy and energy transfer from moving objects and waves	**--Play charades and guess** the energy transfer **acted out** **--Make an illustrated book** about the different kinds of energy transfer

High School—Physics Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
		microwaves, sound waves, light waves, seismic waves			
Standard P4.2: Energy Transformation Representing energy transfer in complex processes Energy conservation Stored energy	**--List different kinds** of energy transfers—sunlight into heat, radio waves into sound, etc. **--Illustrate** one kind of energy transfer, **labeling** origin, transfer wave or object, and result	**--View video clips** of conservation of energy **--Discuss** how energy is transformed, but the total amount of energy never changes	--**Watch a demonstration** of a radiometer that converts light energy into heat energy, then into kinetic energy **--Retell** what is happening in own words	**--Watch a video** of how a car engine works—how gasoline is combined with oxygen to convert to thermal energy **--Discuss** the thermal energy wasted and leaving through the radiator and exhaust pipe	**--Research** energy efficiency in cars **--Report out** on one energy conversion that is more efficient (aerodynamics, bio-diesel fuel, etc.)
Standard P4.3: Kinetic and Potential Energy Forms of energy Transformation between potential and kinetic energy Mechanical systems	**--Sort various pictures into categories** of potential and kinetic energy --**Write and say** a sentence for each picture.	**--Label the pictures and write one sentence** about each	**--Watch video clips or demonstrations** of various mechanical systems—sky lift, roller coaster, grandfather clock, pencil sharpener **--In teams, discuss** what is happening **and explain** the transformation between potential energy and kinetic energy in one example	**--Name** the external energy source for the mechanical systems to maintain motion **--Write one paragraph** describing the transformations of energy, the external energy to maintain the motion, and the end result	**--Give an oral presentation** on kinetic and potential energy, using real objects, charts, scientific terms in context **--Create a quiz** for classmates based on information in presentation
Standard P4.4: Wave Characteristics Wavelength, amplitude,	**--Experiment** with a slinky, rope, water to create different kinds of waves	**--Demonstrate and describe in one sentence** the length, height, speed and	--In teams**, demonstrate** traverse waves by shaking a slinky tied to a door up and	**--Make a T chart** for the characteristics of transverse and compression waves, including an	--Using everyday objects (musical instruments, slinky…), **act out** traverse and

High School—Physics Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
frequency, and speed Transverse and compression waves		quickness of waves as *wavelength, amplitude*, and *frequency: ex: "The larger the amplitude the more energy there is."*	down—use these words: moving across, perpendicular, crest, and trough. "The transverse waves travel perpendicular to the right." **--Demonstrate** compression waves by pushing the slinky back and forth—use these words: longitudinal, moving along, compression, rarefaction. "The longitudinal waves move parallel to the direction of energy transfer."	illustration, definition, and examples Transverse Compression	compression waves **--Create a** song about waves using scientific terms
Standard P4.5: Mechanical Wave Propagation Everyday examples Sound waves Vibrating waves Amplification	**--Experiment** with different musical instruments—drum, violin, flute, guitar… **--Discover** where the sound is coming from (vibrating string, skin, fluttering column…) **--State:** "The source of the sound is the vibrating _____."	**--State what happens** to the fishing bobber when making a wave in a tub: "The bobber goes up and down but does not move forward. The bobber moves in a circular motion." **--Restate in scientific terms—**"The bobber moves forward at the crest of each wave and moves	**--Participate** in a demonstration with a tuning fork, standing at varying distances from the fork. Note the intensity of the sound. **--State 3 findings** from the experiment, using the words distance, intensity, decrease, increase	**--Read leveled books** about sound **--Report out orally** what you have learned **--Rank order** common sounds according to decibel level (jet engine, lawn mower, auto horn, talking, purring cat, whisper, rocket engine)	**--Research** classroom amplifying systems used in the classroom **--Write a report** on various kinds and how they help students learn better

High School—Physics Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
		backward at the trough."			
Standard P4.6: Electromagnetic Waves Electromagnetic spectrum Radio waves Radio message delay See before we hear	**--Listen attentively to a presentation** about radiant energy and electromagnetic waves. **Draw a sketch or picture** to represent something you understand based on viewing or observation.	**--Make a list of "I wonder" questions** about electromagnetic waves	**--Construct** an electromagnetic spectrum on a chart—label and arrange examples from decreasing wavelength to increasing frequency **--State one sentence** describing each example: "Radio waves have a long wavelength and low frequency."	**--Read about or view video clips** about one kind of electromagnetic wave of your choice **--Write a paragraph** about why you chose a particular kind and new information you found out	**--Visit** a local radio station to find out about radio frequency levels used **--Create a chart** showing the difference between light waves and sound waves—why we see lightening before we hear the thunder—use the words speed, wavelength, energy
Standard P4.8: Wave Behavior—Reflection and Refraction Ray diagrams Reflected light paths	**--Experiment** with different kinds of flashlights beaming light on different kinds of surfaces—cloth, wood, mirror, paper, etc.—What do you notice	**--Make a vocabulary chart** for each word, including illustration, definition, sentence, word: *reflection, refraction, surface, ray, transparent*	**--Experiment** with light and mirrors, prisms, spoons, glass, and magnifying lenses **--State in sentence form** what you notice: ex: "I notice that the light goes through the glass, not the mirror."	**--In teams, construct a ray diagram step by step,** following teacher's directions (use construction paper, pinhole, sun, penny) **--Recreate and restate process** with a partner **--Construct** a ray diagram on your own	**--Research** interactive websites on reflection and refraction **--Share different websites** with classmates and vote on best site
Standard P4.9: Nature of Light Transparent objects in clear liquid Various materials reflecting, absorbing, or transmitting light	**--Act out or show** these words: *reflection, transparent, absorption, transmission,* **--Sort words** according to	**--Sort materials** by how light passes or does not pass through—transparent to solid **--State one sentence** on each	**--Read leveled books and take notes** on light interacting with matter	**--Synthesize information** on light and **report orally** to class **--Write a 3 paragraph essay** on light	**--Survey** students on why they think the sun appears red at sunrise and sunset --Write a report on the real reason—include the words:

High School—Physics Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Image of the Sun at sunrise and sunset	endings: -tion, sion **Match** root words and derivatives--ex: absorb-absorption	material--ex: "Glass reflects light." "Water transmits light." "Black paper absorbs light."			absorbs, higher and lower wavelengths, atmosphere
Standard P4.10: Current Electricity—Circuits Electrical energy transformations Common household electrical devices Classification of circuits Voltage, resistance, and current	**--Experiment with building a** circuit with a single battery, wire, and bulb. Which way lights the bulb? **--Write simple instructions with a partner** to show steps of construction using these sentences: "This is an open circuit/closed circuit."	**--Draw** diagrams of open circuits, closed circuits, and short circuits— **--Match labels** to correct circuits **--State one sentence** about each: "This is a _____ circuit because…"	**--Create a chart** of household or school items that transform electricity into light, sound, heat, motion—use pictures or words Light: lamp Sound: radio Heat: toaster Motion: fan, vacuum	**--In teams, research** one aspect of electricity in Michigan —where it comes from, uses, average household use, etc. **--Report out** findings to classmates	**--Write a report on** electricity use in school or own home: voltage used, forms of energy used, amperage, etc. **--Report out** orally to classmates
Standard P4.12: Nuclear Reactions Peaceful Technological applications of nuclear fission Exposure to prolonged radioactive decay Star energy	**--Ask classmates simple prepared survey** about their opinions of nuclear power **--Listen attentively** to a video clip or presentation on nuclear power plants. **Draw** something you saw in the video.	**--Use** a bubble solution to simulate nuclear fusion (smaller bubbles merge into one big one) and fission (splitting of larger bubble into two smaller ones) **--State** what happens **in complete sentences**	**--View video clips** of nuclear power put to good uses **--Take notes and discuss** learning in groups **--Create a group chart** of learnings **and report out** to classmates	**--Research** peaceful and war applications of nuclear energy **--Debate** the advantages and disadvantages of using nuclear power (radiation therapy, radioactive waste)	**--Research** the future of nuclear power—for cars, heating houses, etc. **--Illustrate and write** what life would be like using safe nuclear power **(**no pollution, lower heat bills, etc.)

High School Chemistry Essentials **Michigan Science Linking Document to English Language Proficiency Levels**

High School—Chemistry Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Standard C1: Inquiry, Reflection, and Social Implications					
Standard C1.1: Scientific Inquiry Questioning, Evaluating, Investigating, Identifying Patterns Describing Reasons	**-- Draw scientific pictures** and label them (such as atomic structure, the Periodic Table, acids and bases, etc.) **--**With a partner, **investigate** an interesting science topic (Ions and Isotopes, Chemical bonds, Properties of substances, chemical changes,etc.). Choose a picture to label and describe with two sentences.	**-- Conduct scientific investigations** using realia. Following teacher directions. **--Chart** observations using a T list	**--Generate** list of questions about observations --Use question words such as who, what, when, where, why, what if… **-- Explain T-list** to another team investigating the same question -- Discuss findings and combine into one team chart	**--Maintain** a science journal **--Write** one paragraph about investigation findings	**--Maintain** a science journal with explanations, and label illustrations --**Research** answers to question using books, internet, experts and add to writing
Standard C1.2: Scientific Reflection and Social Implications Critiquing	**--Construct a thinking map or Periodic Table model**	--**Follow 3-4 step directions** and then restate construction directions for another student to	--**Develop "I Wonder" questions** about model ("I wonder if we will discover another element for	**--Read about** Atomic structure, Chemical bonds, the Periodic Table, etc.)	**--Create** an interactive chart of the Periodic Table—including history, element illustrations, uses, etc. and

High School—Chemistry Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Identifying Personal and Social Issues Accessing Information Discussing Evaluating Careers in Science Fields		follow	the Periodic Table.")		**investigate** career fields related to this
Standard C2: Forms of Energy					
Standard C2.2: Molecules in Motion Conduction in solids, liquids, gases	**--Listen attentively** to Science Through Song--"Molecular Motion Dance" by Jim Walters --**Sing along** with a copy of the lyrics	**--Create a vocabulary chart of words**, including illustration, definition, example, sentence: *conduction, transfer, energy, solid, liquid, gas*	**--Restate "**Molecular Motion Dance" in sentences to **describe** transfer of energy **--Demonstrate** better conduction in solids and liquids than gases—ex: heating rocks, heating water, heating steam—which lasts longer? **--State in sentence form** which one conducts heat better	**--Illustrate** states of matter showing object, graph of molecules (solid—tightly packed molecules; liquid—loosely arranged; gas—far apart) **--Give an oral presentation** on molecules in the states of matter	**--Research** plasma as another state of matter—its structure, molecule arrangement, uses in every day life **--Write a report** on findings
Standard C3: Energy Transfer and Conservation					
Standard C3.3: Heating Impacts	**--Experiment** with conducting	**--Experiment** with melting ice	**--Describe** in scientific terms	**--Read books or view video clips**	**--Create** own "Molecular Rap"

High School—Chemistry Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Heat conduction in a solid Melting	heat—put a spoon in hot soup **--Describe** what happens to the handle of the spoon In one sentence	**--Describe** what happens in plain English **--Repeat** teacher's scientific description of what is happening with the energy disrupting the hydrogen bonds of the water molecules to form liquid	other melting instances: melting cheese, chocolate, etc.	about how furnaces work to heat **--Report out** findings	about heat conduction and melting
Standard C3.4: Endothermic and Exothermic Reactions Chemical Reactions	**--Create a lab experiment** demonstrating endothermic and exothermic reactions using 2 beakers of water and adding borax to one beaker and Epsom salts to the other **--Tell what happened** to the temperature of the water in each	**--Make a double-bubble thinking map** of endothermic and exothermic reactions, including the words release energy and absorb energy **--Create a mnemonic** to remember what each word means	**--Explain** what happens in scientific terms when you burn charcoal--what the reaction is and what happens to the energy	**--Research** other chemical reactions **--Make a chart** listing different endothermic and exothermic reactions **--Report out** why each reaction is one kind and not the other	**--Interview** a chemist as a career choice **--Write a report** on benefits, education, career possibilities
Standard C4: Properties of Matter					
Standard C4.2: Nomenclature Compound names and formulas	**--Repeat** names of compounds **--Alphabetize** compound names Ex: Carbon dioxide	**--Match** formulas to compounds Ex: H_20 = water **--Match** common name to scientific name	**--Listen attentively** to a presentation on prefixes and their meaning: Mono = 1; Di = 2	**--Create** a chart of compounds, their common name, formula scientific name and common uses	**--Create** a game for compounds similar to Jeopardy **--Play** game with classmates to review compounds

High School—Chemistry Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
	Nitrous Oxide Sodium chloride	Ex: water = dihydrogen monoxide	Tri = 3; Tetra = 4 etc. **--Practice** matching number of atoms with correct prefix		
Standard C4.3: Properties of Substances Differences in physical and chemical properties	--Using various substances, **demonstrate** solids, liquids, and gasses and make a sentence: **Build a model** using Legos for solids sticking together-- solid, definite shape, volume Pour juice into a container--liquid flows, constant volume, shape of its container Blow smoke into a jar and close the lid --gas, flows, conforms container fills, volume	**--Draw** a chart showing the different arrangement of particles of a solid, liquid, and gas --Using the chart, **talk about** the arrangement of the particles using these words: more ordered, orderly, regular, irregular, definite, not definite, volume, shape	**--Experiment** with helium, cornstarch and water mixture, and various objects **--Report out** findings in terms of solids, liquids, gases	**--Read** leveled books about the states of matter and their properties **--Make mini-leveled books** about each, giving a real life example, illustrations, labels, and descriptive sentences	**--Create a rap** about the properties of solids, liquids, gases
Standard C4.8: Atomic Structure Electrons, Protons, and Neutrons	**--Demonstrate** the structure of an atom using a peach or plum—the pit represents the dense nucleus	**--Draw and label** a diagram of an atom **--Associate** similar words with charges:	**--Create a 3-D model** of an atom using everyday items, showing empty space (electron cloud)	**--Demonstrate** strong force holding together repelling forces of protons by putting 2 positive sides of a battery	--In teams, **create an Atomic Structure quiz** for classmates using information gained about protons,

High School—Chemistry Essentials	Basic ELP Level 1A	Basic ELP Level 1B	Low Intermediate ELP Level 2	High Intermediate ELP Level 3	Proficient ELP Level 4
Description of an atom	and the fruit represents where the electrons move **--With a partner, make a list** of the smallest things students think of: "An atom is a million times smaller than…"	**P**rotons = **p**ositive charge **Neu**trons = **neu**tral or no charge	surrounding a dense center (nucleus) **--Give a presentation** using scientific terms	together –state how the nucleus is kept intact by a strong force **--Read** leveled books about the discovery of atoms	neutrons, electrons, nucleus, positive, negative, neutral
Standard C4.9: Periodic Table Using the Periodic Table	**--Place** element cards in order of the periodic table—notice patterns **--Verify** which category has more elements—metals, nonmetals, or metalloids	**--Match** elements with their symbols **—Say** elements aloud **--**Using the periodic table, **quiz each other** with questions like: "Which element is more metallic—zinc or titanium? "Which is a liquid—mercury or iron?"	**--Group** element cards by physical and then by chemical properties **--Choose 5 elements and state** the atomic number, what the color represents, the chemical symbol, the element name, and atomic mass and what that means	**--Choose 10 elements and state** practical uses: ex: Palladium is used for engagement rings.	--Using the pattern from the Important Book by Margaret Wise Brown, **write an Important Book** about 5 elements of your choice including uses, names, chemical and physical information
Standard C4.10: Neutral Atoms, Ions, and Isotopes Number of protons, neutrons, and electrons in ions and isotopes	**--Listen attentively** to a presentation about atoms, protons, electrons, ions and isotopes **--Retell** definitions of each one, showing examples	**--Create a vocabulary chart of words**, including illustration, definition, example, sentence: neutral atom, ion, isotope, equal, unequal	**--View pictures or video clips** of real life ions (coral reefs) **--Experiment** with different colored beads to represent electrons, neutrons, and protons of elements. Represent a neutral element, a positively charged ion (by taking away	**--Create a chart** of elements, their atomic number, mass number, and examples possible ions and isotopes represented by the number of added or deleted electrons (ions), or added neutrons (isotopes)—use hydrogen, tin,	**--Research** radioactive isotopes , as an example of unstable isotopes **--Write a 3 paragraph essay** on either the dangers or positive uses of radioactive isotopes

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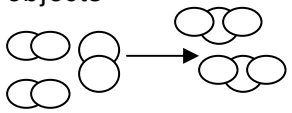
			an electron bead) and a negatively charged ion (by adding an electron bead). Represent isotopes by adding neutrons and making mass bigger	uranium, **--Present** an oral report of chart to classmates	
Standard C5: Changes in Matter					
Standard C5.2: Chemical Changes Simple chemical equations Chemical and Physical Changes Atoms in Physical and Chemical changes	**--Collect** pictures or examples of chemical changes in nature: copper turned green, soured milk, baked cake, fizzing tablets in water, etc. **--Describe** what happens in each picture (The chemical change is _____.)	**--Create a vocabulary chart of words**, including illustration, definition, example, sentence: chemical change, physical change, equation, product, conservation, reactant, coefficient, mass **--Create a chart of root words and suffixes—** <u>Root</u> | <u>suffix</u> React | ant Conserve | tion Equate | tion Apply | ing Relation | ship	**--Make a double-bubble thinking map** of chemical changes and physical changes—include number of atoms in the reactants and number of atoms in the products Ex: Physical= melting butter, freezing water, crushing a can, erosion of soil, shaping clay Chemical= copper turning green, bleached clothes, leaves turning color	**--Demonstrate** balancing a chemical equation through pictures or objects  $2H_2 + O_2 \rightarrow 2H_2O$ **--Orally explain process** to classmates using another equation	**--Act out** balancing equations and conservation of matter through a play
Standard C5.4:	**--Experiment**	**--View** a film clip	--In teams, **graph**	**--Experiment** with	**--Research**

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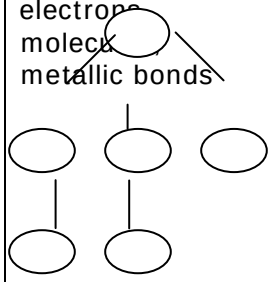
Phase Change / Diagrams Comparing energy levels Temperature graphs	with Alka-selsor tablets dissolving one-quarter of a tablet in hot water and the same in cold water—record time to dissolve **--State what happened** in sentences: "The reaction was faster in hot water than cold water. The temperature made a difference. "	or experiment heating water and aluminum **--Explain orally** what is happening, how long each takes to raise the temperature 10°	the time and temperature of ice-water to melting through to boiling, using a thermometer and stop watch to measure. **--Orally state results in complete sentences:** "At room temperature (66°) it takes 1 hour and 15 minutes for ice water to melt."	other items—butter, cheese, solid oil, etc. Compare times and temperatures and graphs.	**aluminum** and present a report about how aluminum is mined, refined, and used
Standard C5.5: Chemical Bonds—Trends Ionic or Covalent Bonding Formula for binary compounds	**--Construct a concept map** of chemical bonding—use these words: ionic bonds, ions, covalent bonds, electrons, molecules, metallic bonds 	**--Match** real examples to correct chemical bonds Ionic: sea shells, table salt, plaster of Paris Covalent: water, sugar, carbon dioxide, hydrogen **--**State why using the words "transfer of electrons (ionic) or sharing of electrons (covalent)	**--Make a chart** of elements and their root words: **Element — Root** Cl — chlor- F — fluor- Br — brom- O — ox- I — iod- N — nitr- **--Recite formula** for binary compounds of main group elements: "First is the cation – the first element name and then the anion—the root of the second element	**--Practice writing and saying** the formula with different elements: Crisscross the oxidation= the positive oxidation of the first element becomes the subscript of the second element and the negative oxidation of the second element becomes the subscript of the first element: Ex: iron oxide The positive oxidation of iron is +3, and the oxidation of oxide is -2, therefore, iron oxide is	**--Create a skit** acting out the formula for binary compounds of different elements

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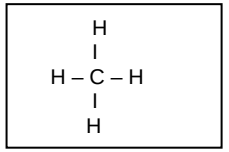
			plus the suffix -ide. " ex: Fe_2O_3 is iron oxide NaI is sodium iodide CaO is calcium oxide	Fe_2O_3	
Standard C5.7: Acids and Bases Formulas Acid-base neutralization Tests for acids and bases pH classifications Different lake beds and adverse effects of acid rain	**--Listen attentively** to a presentation about acids and bases **--List properties** of acids and bases **--Make a list** of foods with a sour or tangy taste= acids. --**Write and read aloud** two sentences such as, "The lemon is sour. It is an acid."	**--Sort pictures or cards** into acids or bases **--State**: "This is an acid because…." "This is a base because…" **--List word forms:** Acid—acids—acidic Base-bases-basic	**--Create a chart of** acids and bases using symbols, pictures, and uses. Item acid/base use	**--Predict** acidity or basicity of common household items and rank order: milk, pop, water, bottled water, laundry detergent, lemon juice, ketchup, ammonia, battery acid, vinegar, blood, milk of magnesia, oven cleaner **--Experiment** with litmus paper to differentiate acids from bases, and level of ph	**--Research** acid rain and how it affects the environment **--Write a report** on Michigan lakes that have limestone beds and those with granite beds—limestone neutralizes the acid rain.
Standard C5.8: Carbon Chemistry Structural formulas for carbon chains Isomers for simple hydrocarbons Polymers—proteins, starches, etc.	**--Construct** a paper clip chain to represent a straight carbon chain, a branched paper clip chain to represent a carbon branched chain where a carbon atom bonds to three or more carbon atoms; a paper clip ring to	**--Chart** common hydrocarbons with prefix, # of carbons, common name **Prefix # name** Meth- 1 methane Eth- 2 ethane Pro- 3 propane But- 4 butane Pent- 5 pentane	**--Add** the drawing of the structural formula for each in the chart: Methane CH_4  Ethane CH_3Ch_3 Propane $CH_3CH_2CH_3$	**--Read** about various hydrocarbons in nature in leveled books—proteins, starches, methane, heptane, etc. **--Report out findings** --**Compare** the structural formula of heptane and isoheptane—isomers have the same formula but atoms are	**--Research** Freon and 2-methyl propane and why the isomer replaced Freon in aerosol sprays --Research the "Crispy Noodle" polymer recently invented that captures carbon dioxide to help make hydro cars more fuel efficient

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	represent a chain of carbon atoms **--State one sentence about each**—"This is a straight carbon chain." or "All the carbon atoms are connected in a line."	Hex- 6 hexane Hept- 7 heptane Oct- 8 octane Non- 9 nonane Dec- 10 decane **--Make a vocabulary chart** of terms, including illustration, definition, example, sentence: starches, proteins, isomer, hydrocarbon, polymer	**--Name** practical uses for these hydrocarbons in a sentence: "We can use propane to heat food."	arranged in a different way	**--Give** an "environmentally friendly" **presentation** to classmates